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NCBC DAVISVILLE
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LETTER OF TRANSMITTAL AND NOTES FROM 10 APRIL 2013 BASE REALIGNMENT AND CLOSURE CLEANUP TEAM TELECONFERENCE WITH ATTACHMENTS NCBC DAVISVILLE RI
4/26/2013
TETRA TECH

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LETTER OF TRANSMITTAL

PITT-04-13-071

Date: April 26, 2013 | **Job No:** 112GN1511

Subject: Notes for the 10 April 2013 BCT Teleconference, Former NCBC Davisville, Rhode Island

TO: Distribution List (see below)

FROM: Lee Ann Sinagoga
Tetra Tech, Inc.

WE ARE SENDING YOU [X] Attached [ ] Under separate cover via _____ the following items:

[ ] Shop drawings [ ]Prints [ ] Plans [ ] Samples [ ] Specifications

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1	April 26, 2013		Subject Teleconference Meeting Notes

THESE ARE TRANSMITTED as checked below:

[ ] For approval [ ] Approved as submitted [ ] Resubmit ___ copies for approval

[X] For your use [ ] Approved as noted [ ] Submit ____ copies for distribution

[ ] As requested [ ] Returned for corrections [ ] Return ____ corrected prints

[ ] For review and comment [ ] Other

REMARKS:

Folks,

Attached are the subject teleconference meeting notes for your information. If you have any questions, I can be reached at 412-921-8887.

SIGNED: Lee Ann Sinagoga
Lee Ann Sinagoga

Distribution:

David Barney (Navy)
Jeff Dale (Navy)
Christine Williams (EPA)
Richard Gottlieb (RIDEM)
Andrew Glucksman (Mabbett)
Robert Shoemaker (Resolution Consultants)

Scott Anderson (Tetra Tech)
Joe Logan (Tetra Tech)
Lee Ann Sinagoga (Tetra Tech)
Tetra Tech Project File (112GN1511)
NIRIS File – S. Currie

NOTES FOR THE 10 APRIL 2013 BCT TELECONFERENCE
FORMER NCBC DAVISVILLE, RHODE ISLAND

PARTICIPANTS

David Barney (Navy)
Richard Gottlieb (RIDEM)
Andrew Glucksman (Mabbett)
Scott Anderson (Tetra Tech)
Christine Williams (EPA)
Lee Ann Sinagoga (Tetra Tech)
Robert Shoemaker (Resolution Consultants)
Joe Logan (Tetra Tech)

The April 10, 2013 teleconference was held to status the action items ***(presented below in bold)*** developed during the March 28, 2013 BCT meeting in Davisville, Rhode Island. These action items were also e-mailed to the team by Ms. Sinagoga on April 3, 2013.

Action Item 1: Mr. Foran/Ms. Sinagoga will discuss Agenda Preparation ideas/skills and will report back to team with recommendations to optimize the agenda. Timeframe: Not specified; however, it is anticipated that this item will be addressed within the next 2 weeks.) *Status:* On-going.

Action Item 2: Ms. Williams will review "metals in groundwater" issue (i.e., Should metals be on the list of COCs for groundwater?) (Timeframe: By next Wednesday, April 3, 2013). (Note: Ms. Williams responded by E-mail on April 1, 2013). *Status:* Action item was completed. See e-mail correspondence from Ms. Williams in Attachment A. Ms. Williams concluded that the metals in the Site 16 groundwater may be site-related, thus, metals should not be removed from the remedial goal tables in the Site 16 PP. Also, please see further discussion under Action Item 3.

Action Item 3: Navy will also address the "metals in groundwater" issue as part of Navy responses to RIDEM comments on Proposed Plan. The RIDEM comments were dated March 26, 2013; one of the RIDEM comments expressed a concern that remedial goals for a few metals such as Cr were set at the basewide background concentration which exceeded the current SDWA MCL. Navy will revisit background groundwater study documentation. (Timeframe: Not specified; however, it is anticipated that the RTCs for the RIDEM will be published within the next 2 weeks). *Status:* Ms. Sinagoga provided an overview of some of the historical information she reviewed regarding this issue (see information presented in Attachment B):

- The Final Basewide Ground Water Inorganics Study Report, NCBC Davisville, Rhode Island (i.e., the background report) is dated September 6, 1996. The document is briefly discussed in the meeting minutes for the 18th RAB meeting (August 15, 1996); the meeting minutes are dated October 3, 1996. The meeting notes state that, based on EPA comments, the EPA recommended statistical analysis will be incorporated into the final version of the report.

- In correspondence dated October 1, 1996, the EPA commented on Navy responses to previous EPA comments on the background report. EPA appended a version of Table 7-4 of the background report (i.e., Proposed Background Inorganic Concentrations) with specific recommendations regarding the background values for silver and antimony. (Please note that no additional EPA recommendations were presented for chromium, nickel, or thallium, the three metals discussed in the RIDEM comments of March 26, 2013.)

- The background study is briefly mentioned in the meeting minutes for the October 10, 1996 RAB.

Ms. Williams referenced the December 1996 BCT meeting notes and a March 17, 1997 e-mail correspondence (from Linda Gardiner, Stone and Webster) as possibly providing useful information (Ms. Williams forwarded the e-mail to the team [Attachment B]) regarding this subject.) She further indicated that the approach to background evaluations has evolved over the course of time. Mr. Gottlieb stated that he did not believe the background values presented in the 1996 background report were ever finalized. He recommended a review of RIDEM comments published in May/July 1996 and a review of the Site 8 and 11 RODs. Both Ms. Williams and Mr. Gottlieb expressed the concern that the basewide-background data values may not provide a picture of water quality specifically upgradient of Site 16 and that some of the values (e.g., the maximum Cr concentration of 214 µg/L) may reflect localized sources of contamination (e.g., the presence of a gas station in the immediately vicinity of a background well). Ms. Sinagoga explained that the basewide background values were not intended to represent what is specifically upgradient of any one NCBC Davisville site. Rather, they were intended to be regional or basewide values representing background conditions across most of the NCBC Davisville facility. Ms. Sinagoga will review the water quality data for wells immediately upgradient of Site 16. The Navy will evaluate whether or not the remedial goals for Cr, Ni, and Tl in the PP should simply be "greater of MCL or a site-specific background value to be determined at a later date". This issue will be further addressed in the Navy's responses to the RIDEM comments of March 26, 2013.

Post Teleconference Update: The Navy reviewed a number of documents from the Administrative Record (please see Attachment B):

- In correspondence dated May 14, 1996, RIDEM did provide comments on the Draft Basewide Groundwater Inorganics Report. A corresponding, response-to-comments document was not located in the Administrative Record.

- The referenced e-mail correspondence of March 17, 1997. The document does briefly mention the basewide background report but the e-mail focuses on the Basewide Groundwater Evaluation report (not the background report).

- Meeting minutes for the 19th RAB (October 10, 1996). The background study was briefly mentioned with regards to the Basewide Groundwater Evaluation report.

- EPA correspondence of November 8, 1996. EPA: "It is recommended that the inorganic data from all seventeen wells be used to establish the background inorganic concentrations." (Top of page 3). The EPA also specifically references the use of the basewide background values at the top of page 2.

- Human Health Risk Assessments for Various NCBC Davisville Sites. A review of the final human health risk assessments for groundwater for Sites 06/08/11/13 (prepared in 1998) indicate the use of most (but, not all) of the basewide background database values during the chemical of potential concern (COPC) process. Footnotes at the bottom of the tables indicate that the source of the background values is the Final Basewide Ground Water Inorganics Study Report, Stone and Webster, 06 September 1996, as revised 15 November 1996. The background chromium value referenced in the March 26, 2013 RIDEM comments is presented in all of the background data tables.

- Record of Decisions (RODs) for Various NCBC Davisville Sites. A review of the final ROD for Sites 10 and 08 (prepared in 1998) indicated that inorganic groundwater results for Site 08 were compared to background inorganic values from the Final Basewide Ground Water Inorganics Study Report, Stone and Webster, September 1996. Additionally, the final ROD for Sites 06/11/13 indicated that the basewide background values were also used for comparison to inorganic groundwater results at these sites. These RODs also indicate that the preferred alternatives for these sites were selected based in part on the results of the Basewide Inorganics Groundwater Study.

- Ground Water Evaluation, NCBC Davisville, RI (dated 08 October 1996). This document compared groundwater results from various investigations to the background groundwater values presented in the Basewide Ground Water Inorganics Study (Stone and Webster, 1996). A table containing "Proposed Backgound Values" is presented and includes background values for chromium, nickel, and thallium.

- In summary, although there may have been concerns expressed at the time the background report was drafted, it appears from the Administrative Record that the Basewide Ground Water Inorganics Study Report was eventually finalized. Even though there are no specific, affirmative statements from either EPA or RIDEM, as per the FFA, even draft final documents become final documents unless dispute is invoked either formally or informally. This seems borne out by the November 8, 1996 EPA correspondence on this subject.

The Navy acknowledges that background issues are often difficult and do evolve over the course of time. However, based on the administrative record, the Basewide Ground Water Inorganics Study is a final document. If a team member has any additional historical documentation or e-mail correspondence that he or she considers particularly relevant to further discussions regard this issue, please forward to Mr. Barney.

Action Item 4: Ms. Williams will send EPA comments on the FSA/PP by April 26th. *Status:* On-going. Ms. Williams noted that the CRMC regulations should be changed from "relevant and appropriate" to "applicable" and recommended the removal of two of residential-type ARARs at

the bottom of Table 3-1 of the FSA. Mr. Barney indicated that he did not object to the removal of the referenced residential-type ARARs at the bottom of Table 3-1. These ARAR-type comments will be more fully addressed after the Navy receives EPA Region I comments on the FSA for Site 16.

Action Item 5: Ms. Williams will review EPA guidance to determine what formally needs to be presented in the FS/ROD regarding the contingency remedy currently being considered for groundwater at Site 16. A full evaluation is not currently presented in the FSA. Is a full evaluation against the FS alternatives evaluation criteria needed? She will also review the actual need for the contingency remedy with Bryan Olson. (Timeframe: By next Wednesday, April 3, 2013) *Status:* This action item was resolved via e-mail correspondence between Ms. Williams and Mr. Dale (please see Attachment A). The "contingency" groundwater remediation strategy discussed in the FSA/PP for Site 16 will not be further developed at this time.

Action Item 6: Navy will re-visit trigger level proposal based on concerns expressed at March 28th meeting. (Timeframe: By April 5th). *Status:* This action item was resolved via e-mail correspondence between Ms. Williams and Mr. Dale (please see Attachment A). "Trigger level" development will continue, as necessary, as a component of the remedial design. Ms. Sinagoga asked if Mr. Sugatt (EPA Region I risk assessor) had reviewed the recommended ecological screening level presented in Appendix E of the FSA for trichloroethylene (1,940 µg/L). Ms. Williams stated that Mr. Suggat had reviewed and accepted the screening level.

Action Item 7: Navy will post Public Notice for the 2013 Five-Year Review in a local paper (North Kingstown Times [most likely] or Providence Journal). The notice will be sent to Dave Barney, Christine Williams, and Rich Gottlieb for review. A copy of the notice will also be placed on the website and in the local information repository. (Timeframe: not specified, but, within the next month). *Status:* On-going. *Post Teleconference Update*: Mr. Anderson has sent draft Public Notice to Navy for review. The Navy will review and send to EPA/RIDEM for review and comment.

Action Item 8: Ms. Williams will check with Mr. Brandon regarding availability for a meeting on modifications to the LTM QAPPs/programs: April 30? May 1? *Status:* Action item completed. The next BCT meeting is set for April 30, 2013 at the Mabbett offices in Providence, Rhode Island. Mr. Brandon will attend. *Post Teleconference Update:* The agenda for the April 30, 2013 BCT meeting was distributed to the team on April 18, 2013.

Action Item 9: Navy (Mr. Barney) to further investigate how to apply residential use restriction across all of the CED area. Mr. Gottlieb to also revisit this issue with RIDEM management. (Timeframe: not specified). *Status:* Mr. Barney has consulted with Navy upper management; applying restrictions to areas not demonstrating "unacceptable CERCLA risk" would be very difficult to defend (i.e., if there is no "unacceptable CERCLA risk", state ARARs are not a factor in remediation decisions based on the Newport Dispute Agreement of January 12, 2012) (Attachment C). Mr. Gottlieb stated that, for legal reasons, an ELUR is necessary (across the site as a whole) and must state that residential land use/excavation/movement of soils off-site are prohibited; a soil management plan (SMP) is also required. Mr. Gottlieb will consult

further with RIDEM legal counsel to get the exact citation from regulations; Mr. Gottlieb sent information to Mr. Barney on April 22, 2013. A time frame for resolution of this action item is pending review of RIDEM correspondence.

Action Item 10: Next BCT Teleconference: April 10th, 10:00-noon. Agenda: Review Action Items established during March 28th meeting. *Status:* Action item was completed by team on April 10, 2013.

18TH RESTORATION ADVISORY BOARD (RAB) MEETING
NCBC DAVISVILLE
MEETING NOTES - 15 AUGUST 1996

The 18th RAB meeting was held at NCBC Davisville, Building 404, Caretaker Site Office (CSO), North Kingstown, RI. The meeting agenda/notification is included as Appendix A. The attendance list is included as Appendix B.

Phil Otis, Remedial Project Manager (RPM), convened the meeting at 7:00 p.m. After introductions, Mr. Otis discussed the renovations underway in Building 404. The building has been leased to RIEDC. The CSO has consolidated on the first floor of the building.

Two corrections were requested for the meeting notes from the 17th RAB meeting: Page 1, paragraph 2 -- the Barnes and Jarnis work plan for reevaluation of lead in soil had not yet been submitted; and Page 2, final paragraph -- EPA's review comments to the Draft PRAP for Site 09 were received via E-mail on 12 June 1996, not 15 May. These statements serve as the formal correction to the 17th RAB Meeting Notes.

Status of Compliance Items

Phase II Environmental Baseline Survey (EBS) - Jane Connet of EA Engineering, Science, and Technology (EA) provided a progress report on the Phase II EBS Review Item Investigation. The field program began in February 1996 and was completed in July 1996. The Draft Phase II EBS Report was submitted to the BCT at the RAB meeting on 15 August 1996. The final report is due 31 October 1996.

The EBS investigation evaluated a total of 92 Review Items (i.e., areas of environmental concern) including 53 Building/Area-related and 39 Septic-related Review Items. The Draft Phase II EBS Report states that no further action is warranted for 35 of the 53 Building/Area-related Review Items, based on field observations, field screening data, and analytical results compared to screening criteria. Removal actions may be required at 18 Review Items: actions may include closing floor drains, removing lead-containing dust and dirt, removing or bio-remediating TPH-containing soil, removing PCB-containing cement, cleaning out catch basins, closing oil-water separators, or removing water from hydraulic lifts.

Septic tanks were investigated at 39 Review Items. Investigations included file/plan review, site walkovers, geophysical surveys, test pit excavation, and sampling of septic sludge. Thirty-four tanks were sampled for TPH, VOC, RCRA 8 metals. Samples from two of the tanks were also analyzed for PCB/Pesticide. The tanks were classified as underground injection control (UIC) systems or individual septage disposal systems (ISDS) based on the known use of the buildings. The Draft Phase II EBS Report provides the following recommendations based on interpretations of the analytical results: no further action for tanks that could not be found; fill in tanks where results were below screening criteria; pump out and fill in tanks where results exceed screening criteria; and further evaluation of the system.

The effect of the Review Items on the Environmental Condition of Property category (category 1 through 7) of the subject subparcels is evaluated in the Draft Phase II EBS Report. This information will be used to assess the availability of the subparcels for lease or transfer.

After the presentation, the question was asked if the locations of the septic tanks were accurately known, especially if the recommendation was to fill in the existing tanks to eliminate potential pathways. Jane Connet indicated that the survey data for the tanks that were located are included in the EBS report as an appendix. A question was raised regarding the need for closure of floor drains. Richard Gottlieb (RIDEM) stated that any floor drains must be permitted by the State or closed.

RIEDC asked when Sites will formally be removed and become available for their use. Mr. Otis said that the Navy needs RIEDC input for two Sites: 1) PCB at the former galley building and, 2) petroleum beneath Building W319. Mr. Otis said that it appears as though the easiest way to remediate the W319 site is to demolish the building. Therefore, the Navy needs to know if RIEDC has plans for future use of Building W319. RIEDC also asked when the EBS Review Items issues discussions will be finalized. Mr. Otis said that such discussions would be finalized by 31 October 1996 and that remediation, if needed, could be in late-Fall 1996 or early Spring 1997. However, no Review Item work plans will be prepared until there is BCT concurrence on the Phase II EBS report.

Other Removal/Cleanup Actions by RAC

Unsafe Building Demolition - Phil Otis indicated that there were 42 Navy and 1 RIEDC (to be removed from the list) buildings slated for demolition. The subcontract will be awarded in October and the work should be completed by the end of December 1996. Howard Cohen (RIEDC) requested a list of the buildings to be demolished. Phil Otis said that the Navy had previously sent a letter to RIEDC which listed the buildings. RIEDC requested that a copy of the letter be faxed. Phil Otis agreed to do so.

Camp Fogarty Debris Removal - Site 10, the Camp Fogarty Debris area, refers to an area behind the firing range, where empty rifle cleaning cans were found with other solid waste. Risks were not associated with the site, and no removal action was required under CERCLA. However, the debris must be removed in accordance with RIDEM solid waste regulations. The debris is scheduled to be removed in the late Fall. Foster Wheeler (RAC contractor) will provide the draft work plan to the BCT tomorrow.

Site 10 is being processed as a no further action PRAP and ROD for soils and ground water. There will be a separate PRAP and ROD for the Sites 06 and 11 soils. Christine Williams said she didn't realize that Site 10 was being separated from Sites 06 and 11 for the PRAP. The draft PRAP for Sites 6, 10, and 11 was submitted today for no further action. The Town of North Kingstown said that their primary interest in Camp Fogarty was related to sites that could affect the Hunt Valley aquifer.

Inorganic Ground Water Maximum Background Values (based on onsite wells)

Analyte (ug/l)	mean	standard deviation	95%UCL	max value 10 wells	well No.	Max value with VOC	Well No.	Max value with turbid	Well No.	Back-ground Value	M.C.L	SMCL	RBC industrial
Aluminum	1849	3351	5315	3560	WD-1	NC		13200	MW-WD-2	5315	NA	200	37000
Antimony				ND (12)		NC		NC		ND (6)	6	NA	15
Arsenic				6.4	MW-Z2-3	NC		NC		6.4	50	NA	11
Barium				38.6	MW-Z1-4	39.5	MW-Z3-2	80.5	MW-WD-2	80.5	2000	NA	2600
Beryllium				1	##	NC		1.3	MW-WD-2	1.3	4	NA	0.016
Cadmium				3	MW-Z1-4	NC		NC		3	5	NA	18
Calcium	10488	6667	13302	12600	MW-Z2-3	27500	MW-Z1-1	NC		13302	NA	NA	NA
Chromium				214	MW-Z1-4	NC		NC		214	100	NA	37000
Cobalt				12.5	MW-Z1-4	21.2	MW-Z3-1	24.9	MW-WD-2	24.9	NA	NA	2200
Copper				ND (9)		10.8	MW-Z3-2	25.8	MW-WD-2	25.8	NA	1000	1500
Iron	8835	9474	37235	25500	MW-Z2-3	NC		NC		25500	NA	300	11000
Lead				2.7	MW-Z1-4	NC		4.8	MW-WD-2	4.8	15	NA	NA
Magnesium	2850	2444	5126	3250	MW-Z2-3	NC		9290	MW-WD-2	5126	NA	NA	NA
Manganese	947	1171	3292	4300	MW-Z2-3	NC		NC		3292	800 (propo sed)	50	180
Mercury				ND (0.2)	All wells	NC		NC		ND (.1)	2	NA	11
Nickel				154	MW-Z1-4	NC		NC		154	NA	NA	730
Potassium	2688	2120	3843	7020	MW-Z1-4	NC		8730	MW-WD-2	3843	NA	NA	NA
Selenium				2.2	MW-WD-3	NC		NC		2.2	50	NA	180
Silver				ND (1)	##	NC		NC		ND(0.5)	NA	100	180
Sodium	8748	4481	12346	13100	MW-Z1-2	17900	MW-Z4-1	NC		12346	NA	NA	NA
Thallium				4.1	MW-Z2-4	NC		NC		4.1	2	NA	NA
Vanadium				9	##			24.4	MW-WD-2	24.4	NA	NA	260
Zinc				39.8	MW-WD-1	69.5	MW-Z3-2	89.9	MW-WD-2	89.9	NA	5000	11000

½ detection limit was used for the background value for analytes that were at or below the maximum detection limit

note: "10 wells" include all on site wells except those impacted by VOC or turbidity; wells with VOC - see tbl. 7-1; wells with turbidity see tbl. 7-2

NC = no change in maximum value due to VOC and/or turbidity

MW-Z1-1, MW-Z1-2, MW-Z1-3, MW-Z1-4, MW-Z2-1, MW-Z2-3, MW-Z2-4, MW-Z2-5, MW-Z2-6, MW-WD-1, MW-WD-3

ATTACHMENT A

RELEVANT E-MAIL CORRESPONDENCE

Sinagoga, Lee Ann

From: Williams, Christine <williams.christine@epa.gov>
Sent: Monday, April 01, 2013 8:55 AM
To: Dave Barney; Jeff Dale; Rich Gottlieb
Cc: Sinagoga, Lee Ann; Anderson, Scott; Andrew Glucksman
Subject: Davisville site 16 PRGs for metals & "contingency" remedy

I looked back over my files on cleanup goals for site 16 and only see that I requested cleanup to protective levels or ARARs. The metals discussion wasn't mentioned.

I cannot agree that the metals should be removed from the table since some of them were above MCLs and risk levels. I believe there is a likelihood that metals are site related since bldg 41 contained metal parts cleaning operations and the waste solvent could be the source of the contaminant groundwater plume. Therefore, I cannot agree to the Navy proposal that metals in groundwater are not site related.

I can agree that the table can be an "either - or statement" of background or MCL whichever is higher since we haven't established the "approval" of the groundwater background study and more work is needed to get to an acceptable background level. (seems this is similar to the manganese discussion at your other Site, Dave)

As for the "contingency " remedy—I can go along with the lack of evaluation in the FS provided that your trigger value is the ecological screening level. I understand the historical values are very close to that level on occasion, so a discussion of a resonable average of sampling results should be undertaken by the team.

Christine A.P. Williams
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e-mail - williams.christine@epa.gov

"Sometimes leadership is planting trees under whose shade you'll never sit." Gov. Jennifer M. Granholm

Sinagoga, Lee Ann

From: Dale, Jeffrey M CIV NAVFAC MIDLANT, EV <jeffrey.m.dale@navy.mil>
Sent: Thursday, April 04, 2013 1:15 PM
To: Williams, Christine
Cc: Richard Gottlieb; Barney, David A CIV NAVFACHQ, BRAC PMO; Andrew Glucksman; Anderson, Scott; Sinagoga, Lee Ann
Subject: RE: Davisville site 16 trigger value for contingency remedy

Christine

We definitely agree that the pore water concentration of contaminants should be the location of concern for ecological trigger values. Not the surface water values we calculated and proposed. I think we agree that it is easier to monitor shoreline wells versus pore water 0-1 foot below the harbor floor. If feasible, and we elect to routinely measure contaminant concentrations in the 0-1 foot zone beneath the harbor.
There would be no DAF applied to the results and the DAF discussion would be unnecessary.

Consider this document that some people from your Narragansett Lab worked on.
http://www.epa.gov/superfund/health/conmedia/sediment/pdfs/Passive_Sampl
er_SAMS_Final_Camera_Ready_-_Jan_2013.pdf

We feel strongly that a dilution attenuation factor (DAF) is appropriate for measurements from shoreline wells because of the measured degradation of contaminants in water 8-10 feet below the harbor to water
0-1 foot below the harbor. The TCE concentration gets lower and DCE concentrations get higher, so it is not pure dilution.

I propose that we either identify a "preliminary DAF", or revise the text to state that a DAF would be developed as part of the design or LTM plan, or that contaminants could be measured directly in the pore water.
Scott and I each calculated DAF values different ways and arrive at a value 2. We are only apart by a DAF of 1 or 2, or may not need one at all.

I don't think this issue should hold up the PP, and suggest we edit the text as I propose.

Thanks
Jeff
-----Original Message-----
From: Williams, Christine [mailto:williams.christine@epa.gov]
Sent: Monday, April 01, 2013 8:55
To: Barney, David A CIV NAVFACHQ, BRAC PMO; Dale, Jeffrey M CIV NAVFAC MIDLANT, EV; Rich Gottlieb
Cc: leeann.sinagoga@tetratech.com; Scott Anderson; Andrew Glucksman

Subject: Davisville site 16 PRGs for metals & "contingency" remedy

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Sinagoga, Lee Ann

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Sent: Thursday, April 04, 2013 2:12 PM
To: Dale, Jeffrey M CIV NAVFAC MIDLANT, EV
Cc: Richard Gottlieb; Barney, David A CIV NAVFACHQ, BRAC PMO; Andrew Glucksman; Anderson, Scott; Sinagoga, Lee Ann; Peterson, David; Brandon, William; Olson, Bryan; Sugatt, Richard
Subject: RE: Davisville site 16 trigger value for contingency remedy

Jeff-
I'm glad Navy aggress that the porewater is where the contingency remedy trigger value needs to be 'measured'. The question we have is whether or not the data you are using to calculate the DAF of 2 is representative. A study of the plume discharge area is most likely what is needed to gain the confidence as to what the attenuation factor should be for this plume, for site 7, & for site 9...

So- your suggestion for the path forward for this issue of the trigger value, to kick the can so to speak, would be acceptable to us- " revise the text to state that a DAF would be developed as part of the design or LTM plan, or that contaminants could be measured directly in the pore water" If you leave both options available it gives us flexibility in the Remedial Design. We would then agree to the loose discussion of the contingency remedy implementation in the Proposed Plan & feasibility study addendum as it is now-

I will have comments on the ARAR tables and appendix E to forward by the 26th--hopefully before then!

Christine

Christine A.P. Williams
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http://www.epa.gov/superfund/health/conmedia/sediment/pdfs/Passive_Sampl
er_SAMS_Final_Camera_Ready_-_Jan_2013.pdf

We feel strongly that a dilution attenuation factor (DAF) is appropriate for measurements from shoreline wells because of the measured degradation of contaminants in water 8-10 feet below the harbor to water
0-1 foot below the harbor. The TCE concentration gets lower and DCE concentrations get higher, so it is not pure dilution.

I propose that we either identify a "preliminary DAF", or revise the text to state that a DAF would be developed as part of the design or LTM plan, or that contaminants could be measured directly in the pore water.
Scott and I each calculated DAF values different ways and arrive at a value 2. We are only apart by a DAF of 1 or 2, or may not need one at all.

I don't think this issue should hold up the PP, and suggest we edit the text as I propose.

Thanks
Jeff
-----Original Message-----
From: Williams, Christine [mailto:williams.christine@epa.gov]
Sent: Monday, April 01, 2013 8:55
To: Barney, David A CIV NAVFACHQ, BRAC PMO; Dale, Jeffrey M CIV NAVFAC MIDLANT, EV; Rich Gottlieb
Cc: leeann.sinagoga@tetratech.com; Scott Anderson; Andrew Glucksman
Subject: Davisville site 16 PRGs for metals & "contingency" remedy

I looked back over my files on cleanup goals for site 16 and only see that I requested cleanup to protective levels or ARARs. The metals discussion wasn't mentioned.

I cannot agree that the metals should be removed from the table since some of them were above MCLs and risk levels. I believe there is a likelihood that metals are site related since bldg 41 contained metal parts cleaning operations and the waste solvent could be the source of the contaminant groundwater plume. Therefore, I cannot agree to the Navy proposal that metals in groundwater are not site related.

I can agree that the table can be an "either - or statement" of background or MCL whichever is higher since we haven't established the "approval" of the groundwater background study and more work is needed to get to an acceptable background level. (seems this is similar to the manganese discussion at your other Site, Dave)

As for the "contingency " remedy-I can go along with the lack of evaluation in the FS provided that your trigger value is the ecological screening level. I understand the historical values are very close to that level on occasion, so a discussion of a resonable average of sampling results should be undertaken by the team.

Christine A.P. Williams
Federal Facility Superfund Section
US EPA New England
5 Post Office Square - Suite 100
Mail Code - OSRR 07-3

Boston MA 02109-3912
phone - (617) 918-1384
fax - (617) 918- 0384
e-mail - williams.christine@epa.gov

"Sometimes leadership is planting trees under whose shade you'll never sit." Gov. Jennifer M. Granholm

Sinagoga, Lee Ann

From: Dale, Jeffrey M CIV NAVFAC MIDLANT, EV <jeffrey.m.dale@navy.mil>
Sent: Monday, April 08, 2013 1:31 PM
To: Williams, Christine
Cc: Richard Gottlieb; Barney, David A CIV NAVFACHQ, BRAC PMO; Andrew Glucksman; Anderson, Scott; Sinagoga, Lee Ann; Peterson, David; Brandon, William; Olson, Bryan; Sugatt, Richard
Subject: RE: Davisville site 16 trigger value for contingency remedy

Christine

Thanks for concurring with our suggestion. We will edit the FSA to reflect this agreement.

Jeff

-----Original Message-----
From: Williams, Christine [mailto:williams.christine@epa.gov]
Sent: Thursday, April 04, 2013 14:12
To: Dale, Jeffrey M CIV NAVFAC MIDLANT, EV
Cc: Richard Gottlieb; Barney, David A CIV NAVFACHQ, BRAC PMO; Andrew Glucksman; Anderson, Scott; Sinagoga, Lee Ann; Peterson, David; Brandon, William; Olson, Bryan; Sugatt, Richard
Subject: RE: Davisville site 16 trigger value for contingency remedy

Jeff-
I'm glad Navy aggress that the porewater is where the contingency remedy trigger value needs to be 'measured'. The question we have is whether or not the data you are using to calculate the DAF of 2 is representative. A study of the plume discharge area is most likely what is needed to gain the confidence as to what the attenuation factor should be for this plume, for site 7, & for site 9...

So- your suggestion for the path forward for this issue of the trigger value, to kick the can so to speak, would be acceptable to us- " revise the text to state that a DAF would be developed as part of the design or LTM plan, or that contaminants could be measured directly in the pore water" If you leave both options available it gives us flexibility in the Remedial Design. We would then agree to the loose discussion of the contingency remedy implementation in the Proposed Plan & feasibility study addendum as it is now-

I will have comments on the ARAR tables and appendix E to forward by the 26th--hopefully before then!

Christine

Christine A.P. Williams
Federal Facility Superfund Section
US EPA New England
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e-mail - williams.christine@epa.gov

"Sometimes leadership is planting trees under whose shade you'll never sit." Gov. Jennifer M. Granholm

-----Original Message-----
From: Dale, Jeffrey M CIV NAVFAC MIDLANT, EV [mailto:jeffrey.m.dale@navy.mil]
Sent: Thursday, April 04, 2013 1:15 PM
To: Williams, Christine
Cc: Richard Gottlieb; Barney, David A CIV NAVFACHQ, BRAC PMO; Andrew Glucksman; Anderson, Scott; Sinagoga, Lee Ann
Subject: RE: Davisville site 16 trigger value for contingency remedy

Christine

We definitely agree that the pore water concentration of contaminants should be the location of concern for ecological trigger values. Not the surface water values we calculated and proposed. I think we agree that it is easier to monitor shoreline wells versus pore water 0-1 foot below the harbor floor. If feasible, and we elect to routinely measure contaminant concentrations in the 0-1 foot zone beneath the harbor.
There would be no DAF applied to the results and the DAF discussion would be unnecessary.

Consider this document that some people from your Narragansett Lab worked on.
http://www.epa.gov/superfund/health/conmedia/sediment/pdfs/Passive_Sampl
er_SAMS_Final_Camera_Ready_-_Jan_2013.pdf

We feel strongly that a dilution attenuation factor (DAF) is appropriate for measurements from shoreline wells because of the measured degradation of contaminants in water 8-10 feet below the harbor to water
0-1 foot below the harbor. The TCE concentration gets lower and DCE concentrations get higher, so it is not pure dilution.

I propose that we either identify a "preliminary DAF", or revise the text to state that a DAF would be developed as part of the design or LTM plan, or that contaminants could be measured directly in the pore water.
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From: Williams, Christine [mailto:williams.christine@epa.gov]
Sent: Monday, April 01, 2013 8:55
To: Barney, David A CIV NAVFACHQ, BRAC PMO; Dale, Jeffrey M CIV NAVFAC MIDLANT, EV; Rich Gottlieb
Cc: leeann.sinagoga@tetratech.com; Scott Anderson; Andrew Glucksman
Subject: Davisville site 16 PRGs for metals & "contingency" remedy

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As for the "contingency " remedy-I can go along with the lack of evaluation in the FS provided that your trigger value is the ecological screening level. I understand the historical values are very close to that level on occasion, so a discussion of a resonable average of sampling results should be undertaken by the team.

Christine A.P. Williams
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e-mail - williams.christine@epa.gov

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ATTACHMENT B

ADMINISTRATIVE RECORD DOCUMENTS

#623

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203-2211

May 14, 1996

Mr. Philip Otis
U.S. Department of the Navy
Northern Division - NAVFAC
10 Industrial Highway
Code 1811/PO - Mail Stop 82
Lester, PA 19113-2090

Re: Review of Draft Basewide Ground Water Inorganics Study Report, at the former Naval Construction Battalion Center - Davisville, Rhode Island

Dear Mr. Otis:

Please find attached the Environmental Protection Agency's (EPA) comments on the subject document.

EPA's definition of "inorganic background for groundwater" is the inorganic levels found in groundwater that has not be impacted by known sources, since the inorganic concentrations may change with the introduction of various chemicals (e.g., organic chemicals such as petroleum products). Therefore, as was discussed in the November 16, 1995 work plan meeting and re-iterated in a letter dated December 5, 1995 from Christine Williams to Phil Otis, the data from well locations in areas impacted by known sources will be useful to understand for a cleanup decision, but EPA did not agree to use this impacted data to establish the NCBC background range. Only the results from well locations in areas not impacted by known sources are appropriate to be used to establish background values. Therefore, the inorganic groundwater background range must be re-calculated.

Additionally, the wells that exhibited high turbidity during sampling should either re-sampled or removed from the data set.

If you have any questions with regard to this letter, please contact me at (617) 573-5736.

Sincerely,

Christine A.P. Williams
Remedial Project Manager
Federal Facilities Superfund Section

Enclosure

cc: Richard Gottlieb, RIDEM
Walter Davis, CSO
Bill Brandon, EPA
Alan Klinger, EPA
Scot Gnewuch, ADL
Jim Shultz, EA
Bryan Wolfenden, RI RC&D Council Inc.
Howard Cohen, RIEDC
Susan Licardi, ToNK

EPA Comments on the Basewide Ground Water Inorganics Study Report

General Comments

1. When additional water level measurements are taken it is recommended that water elevations be measured simultaneously at various points in the different streams. This will provide a better overall understanding of the site hydrology. This information should be added to the report.

2. The figures require some editing. It is difficult at some locations (e.g. Site 13 area) to determine the well designations because the lettering overlaps. Please make all well designations and ground water elevations legible on all figures.

3. Several background wells appear to be downgradient of sources. These include Z-4-1, Z-4-2, Z-3-2, Z-3-3, and Z-2-6. These wells should not be included in the background range for NCBC.

4. Wells Z3 - 1 and 3 should not be used as background wells due to their containing volatiles, especially Z3-1 with **high** volatile concentrations.

5. Background turbidity is definitely too high in wells WD-2 and Z3-3, and probably too high in wells Z3-2 and Z4-1. Therefore, either re-sample the wells or do not include them in the groundwater background range for NCBC.

6. Statistical information on the data was not included in the report. Please include the tables including both geometric means and median.

7. The inorganic groundwater background range should include only data from wells Z1-1, Z12-2, Z1-3, Z2-1, Z2-3, Z2-4, Z2-5, WD-1 and WD-3.

8. Summary and Conclusions
Additional changes should be made in this section corresponding to the comments provided above and below on the different sections.

Specific Comments

9. Figure 2
The size of the data points used to develop this contour map should be expanded so they are visible to the reader. The date that these contours represent should also be provided on this figure.

10. Page 6, Section 3.2
It is recommended that a paragraph be provided at this location, that describes how the watersheds correlate to the zones. This description has been provided on page 15 but until the reader reaches that page, it is unclear how the zones correlate to the watersheds.

11. Page 7, last complete paragraph
It is stated that each piezometer was filled with water and the water level recorded over time. This is valuable information and the water levels should be provided in the report.

12. Page 9, Section 3.3, third paragraph
It is recommended that a brief paragraph be provided that describes the differences between Round 1 and Round 2 measurements. This paragraph should provide the maximum and minimum measured difference, the location of the maximum difference (i.e. well and zone), and the average difference for all wells. A brief statement should also be included that indicates how the overall contour pattern would or would not differ between Round 1 and Round 2 as well as how the gradients may or may not differ.

13. Page 10, Section 3.4
A brief statement should be provided that indicates the orientation of the cleavage planes and shistosity within the bedrock. In addition, the degree of fracturing within the bedrock and the orientation of the fractures should be provided.

14. Page 11, second paragraph, third sentence
It this a typo? Should it be changed as follows:
"... marsh vegetation is deposits are 1 to 2 feet in thickness ..."

15. Figure 21
This map is very difficult to interpret. No key is provided and the lack of color makes it difficult to determine delineate contours. It is recommended that either a better black and white map, or a color map be provided.

16. Page 12, third paragraph
Why were subsurface deposits in Zone 3 classified as glaciofluvial/lacustrine as opposed to only glaciofluvial. Although a minor point, lacustrine could imply the presence of varved clays which

would have a significant impact on ground water flow and transport. If these deposits are in fact "lacustrine", rationale for this conclusion should be provided.

17. Figure 5
The NIKE missile base should be labeled in this figure.

18. Page 16, MW-Z1-1
The statement: "The location of the well is upgradient of ground water flow onto the base." is incorrect. Ground water enters the site upgradient from this well location. In addition, a potential source of contamination is located upgradient from this well which is the Texaco station located across Route 1. Therefore, Table 3-2 is incorrect because no sources are identified.

19. Page 16, MW-Z1-2
Please explain the term "localized altitudinal high". It appears that ground water merely flows from west to east, toward Mill Creek, at this location.

20. Page 16, MW-Z2-4 and MW-Z2-5
In addition to stating that these wells are located downgradient of Site 13, a statement that they are located north of Site 13 should also be provided in the text.

21. Page 16 through 18, background well locations in general
A reference should be provided regarding the figure where each well is located.

22. Page 19, second bullet
Additional explanation is required regarding the evaluation of the spatial distribution of ground water environments. It is unclear what is meant by this statement as it is written. In addition, how were pre-base topographic depressions and rises used to evaluate ground water? Does this mean the "pre-base" maps were used to locate where depressions and rises were located prior to development of NCBC, and then background wells were placed only in/on those depressions or rises that are still present and have not been filled/excavated.?

23. Page 19, last complete paragraph
The statement "In addition, IR Program sites in these areas contain contaminants which have densities lighter than water,..." is may not be entirely true. BTEX has been detected at low levels at Site 13 and Site 11, however, chlorinated solvents, many of which are heavier than water, have been detected at low levels in the vicinity of Site 13.

24. Table 3-2: Z-2-6 which **should be included as downgradient ,** as it is just downgradient of area of contamination area #13. They did include WD-1 which I feel is near to a contamination area but is **not** downgradient therefore should not be included as downgradient.

25. Table 3-2 provide rationale for moving and deleting wells from the study in more detail in the text and reference the page of discussion here.

26. Tables 4-1 through 4-4
Definitions of the terms MS, IDL, CRDL, MCL, and SMCL should be provided on these tables.

27. Tables 4-1 through 5-1
A description of Qual, and Limit, should be provided on each table. It is recommended that Result be changed to Detected Concentration, and that the Dil column be removed and replaced with the most conservative of the Ground Water Quality Standards presented in Table 1-1 to provide the reader easy comparison.

28. Table 5-1 the purging Data from Camp Fogarty is not in App. D, also some of the tables contain information that is the same for consecutive wells, please revise the appendix.

29. Page 30, third paragraph
The first sentence states that "many elevated lead concentrations" were detected in the public water supply wells. It is recommended that this sentence be changed to indicate that five exceedences of water criteria were detected, and the maximum concentration exceeding the criteria (15 ug/L which is the MCL and RI criteria) was only 24 ug/L. The difference between this maximum and the criteria may be insignificant if the uncertainty associated with these analyses is considered.

30. Table 6-2
The percentage of samples exceeding the lead criteria should be 8.62% and not 10.34%. This was obtained using a total of 58 samples and 5 exceedences. A note should also be provided at the bottom of this table indicating how non detects were used in the statistical calculations.

31. Page 32, fifth paragraph
It is recommended that wells MW-Z3-1 and MW-Z3-3 not be used as part of the basewide background data set. However, if they are used, greater detail should be provided regarding how the conclusion was drawn that inorganic concentrations at these wells were not artificially elevated. The detail should include a table that compares metal concentrations in these two wells to average and maximum concentrations of all other background wells.

32. Sections 7.1 and 7.2
References are made in these sections that comparisons between different data sets was made (i.e. comparisons of Main Center vs. West Davisville, upland vs. lowland, and historical vs. site metal concentrations) however, no tables are provided that illustrates these comparisons. The results of these comparisons should be provided.

33. Table 7-1
Greater detail should be provided in this table. These details should include, the average concentration (arithmetic, and geometric), the standard deviation, and the well where the maximum concentration was detected. When averaging, if a compound was not detected, half the detection limit for each compound should be used.

34. Table 8-1
As with Table 6-2, a note should also be provided at the bottom of this table indicating how non detects were used in the statistical calculations.

35. Page 38 last bullet
Should table 6-1 be 7-1? Also which column? indicate here, in the text, and in the table (table 7-1) and provide sufficient rationale

36. Page 40
Beef up discussion why no background wells put in and why no action is warranted. Can reference previous discussions, but some additional text is needed.

37. Check figure 20 public supply locations

38. App D check all tables for information verification from field notes, also add Camp Fogarty purging data, also the last 8-9 well sheets seem to be identical in both the header info and the parameters, only the well ID has changed. These changed were mailed to EPA but not to all reviewers as was requested in an e-mail from Christine Williams, EPA, to Phil Otis, Navy, on 4-16-96.

Background

32

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
DIVISION OF SITE REMEDIATION
291 Promenade Street
Providence, R.I. 02908-5767

May 1996

14 May 1996

Mr. Philip Otis, P.E., Remedial Project Manager
US Department of the Navy, Northern Division
Code 18, Mail Stop #82
10 Industrial Highway
Lester, PA 19113-2090

RE: Draft Basewide Groundwater Inorganics Report
NCBC Davisville, Rhode Island
Submitted 5 April 1996, Dated 4 April 1996

Dear Mr. Otis;

The Rhode Island Department of Environmental Management (RIDEM), Division of Site Remediation has reviewed the above referenced document and comments are attached.

If you have any questions or require additional information please call me at (401) 277 3872 ext. 7138.

Sincerely,

Richard Gottlieb, P.E.
Principal Sanitary Engineer

Attachment:

cc: W. Angell, DEM DSR
C. Williams, EPA Region 1

COMMENTS FOR:

DRAFT BASEWIDE GROUND WATER INORGANICS STUDY REPORT NCBC DAVISVILLE, RHODE ISLAND

Submitted 5 April 1996

1. **Page 1, Section 1.1, Purpose and Scope of Investigation; 2nd Bullet, First Sentence.**

   Please explain what a "secondary contaminate" is.

2. **Page 2, Section 1.1, Purpose and Scope of Investigation; 1st Bullet.**

   Please be advised that the proposed "Site Remediation Regulations" contain standards for GB groundwater. This should be reflected in this bullet since any actions taken as a result of this study probably will take place after these new regulations are promulgated.

3. **Page 32, Section 7.1, Evaluation of Data; Bullet 1.**

   Review of inorganic analyses, and comparison to regional supply well water quality data and MCLs/SMCLs, to characterize background conditions.

   This statement should be revised to reflect that the use of regional supply wells as a comparison to background conditions only applied to Camp Fogarty (Site 10).

4. **Page 32, Section 7.1, Evaluation of Data; Paragraphs 3 thru 5.**

   Please note that background should represent those areas that have not been impacted by known sources or activities at the base. Since MWZ3-1 and MWZ3-3 have VOCs they should not be included in the background data set.

5. **Page 32, Section 7.1, Evaluation of Data; Paragraph 4, Sentence 3.**

   This sentence states that the former NIKE missile base is a known source area for chlorinated solvents. This sentence should be revised to state that it is a possible source of chlorinated solvents since we are still investigating this site for that purpose.

6. **Page 34, Section 7.3, Presentation of Background Inorganic Values; Paragraph 2, Whole Paragraph.**

This paragraph proposes to utilize the maximum value detected in the background wells (both NCBC and regional) as the background concentration. The proposed "Site Remediation Regulations" suggest that background should be related to the area of concern. Therefore, each major area of the base should have a background value selected which is based on a statistical analysis of the background data for that area with an appropriate upper confidence limit.

7. **General Comment.**

Please note that based on the 16 November 1995 meeting between EPA, RIDEM, Navy, and its consultant Stone and Webster some of the wells were placed to determine if contamination existed at a certain location. These wells were not intended to be used as background wells which include wells MW-Z2-6, MW-Z3-2, MW-Z3-3, MW-Z4-1, and MW-Z4-2. Therefore, the results from these wells should not be used in the calculation of background values.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203-0001

August 6, 1996

Mr. Philip Otis
U.S. Department of the Navy
Northern Division - NAVFAC
10 Industrial Highway
Code 1811/PO - Mail Stop 82
Lester, PA 19113-2090

Re: Review of Draft Redlined Basewide Ground Water Inorganics Study Report, dated 14 June 1996, at the former Naval Construction Battalion Center (NCBC) - Davisville, Rhode Island

Dear Mr. Otis:

Pursuant to § 7.6 of the NCBC Federal Facility Agreement (FFA), the Environmental Protection Agency's (EPA) has reviewed the above referenced document. Please find our comments enclosed.

EPA's definition of "natural inorganic background for groundwater" is the inorganic levels found in groundwater that has not be impacted by known sources, since the inorganic concentrations may change with the introduction of various chemicals (e.g., organic chemicals such as petroleum products). As was discussed in the November 16, 1995 work plan meeting and re-iterated in a letter dated December 5, 1995 from Christine Williams to Phil Otis, the data from well locations in areas impacted by known sources will be useful to understand for a cleanup decision, but EPA did not at that time, agree to use this impacted data to establish the NCBC background range. However, EPA has recently conducted an analysis (enclosed) of all the data from the four watersheds which shows that the impacted well data is not significantly different from the other data sets and therefore the use of the data from all 17 on Site wells for the proposed background values will be accepted by EPA at the NCBC Site.

Additionally, the wells that exhibited high turbidity during sampling should have been re-sampled, however in the interest of using the data available and since the previously mentioned analysis shows no significant difference between the non-turbid and turbid values, the turbid values have been included in the recommended background values.

However, the use of the public supply well data from non-Site specific sources is not appropriate because the resulting data set represents a regional perspective not a site specific perspective of background. Therefore, the proposed NCBC inorganic groundwater background values must be re-calculated. I

have enclosed a table with the recommended background values shaded. Some of the Navy proposed values are included in the table while some of the 95% UCL values are recommended and some of the maximum site specific values are recommended. The recommendations are based on the idea that only Site specific well data should be used and where appropriate, the 95% UCL should be used rather than Site maximum.

The original question that started this study, asked in August 1994 during the public comment period for the proposed plan for Sites 5 and 8 of whether or not the manganese levels at Sites 5 and 8 were indicative of natural background, has been answered in the affirmative. EPA looks forward working with the BCT to wrap up this study and proceed along the CERCLA process for this groundwater operable unit.

If you have any questions with regard to this letter, please contact me at (617) 573-5736.

Sincerely,

Christine A.P. Williams
Remedial Project Manager
Federal Facilities Superfund Section

Enclosures

cc: Richard Gottlieb, RIDEM
Walter Davis, CSO
Bill Brandon, EPA
Alan Klinger, EPA
Ken Brown, EPA Las Vegas
Scot Gnewuch, ADL
Rayomand Bhumgara, Gannett Fleming
Jim Shultz, EA
Bryan Wolfenden, RI RC&D Council Inc.
Howard Cohen, RIEDC
Susan Licardi, ToNK

Table was missing from document.

Final

Basewide Ground Water Inorganics Study Report NCBC Davisville, Rhode Island

Prepared for:

Department of the Navy
Northern Division
Naval Facilities Engineering Command
Lester, Pennsylvania

Prepared by:

Stone & Webster Environmental
Technology & Services
Boston, Massachusetts

Under contract with:

EA Engineering, Science, and Technology
Sparks, Maryland

6 September 1996
Contract No. N62472-92-D-1296
Contract Task Order No. 0032

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203-0001

October 1, 1996

Mr. Philip Otis
U.S. Department of the Navy
Northern Division - NAVFAC
10 Industrial Highway
Code 1811/PO - Mail Stop 82
Lester, PA 19113-2090

Re: Review of Navy Responses to EPA Comments Included with the Final Basewide Ground Water Inorganics Study Report, dated September 6, 1996, at the former Naval Construction Battalion Center - Davisville, Rhode Island

Dear Mr. Otis:

Please find enclosed the Environmental Protection Agency's (EPA) comments on the subject responses. In our review of the redlined draft final document (see EPA comment letter dated August 6, 1996), EPA did not fully evaluate the nondetects found during the study. However, in reviewing the Navy responses to EPA comments, EPA noted that a comment concerning the use of nondetects was not completely addressed, (EPA comment #33). Accordingly, EPA has revised the recommended values for those analytes that were at or below the maximum detection limit used in this study. Please revise table 7-4 to reflect the use of ½ the detection limit in proposing inorganic background concentrations.

If you have any questions with regard to this letter, please contact me at (617) 573-5736.

Sincerely,

Christine A.P. Williams
Remedial Project Manager
Federal Facilities Superfund Section

Enclosure

cc: Richard Gottlieb, RIDEM
Walter Davis, CSO
Bill Brandon, EPA
Alan Klinger, EPA

Tim Prior, USF&WS
Ken Finkelstein, NOAA
George Horvat, Dynamac
Linda Gardiner, S&W Eng.
Jim Shultz, EA
Bryan Wolfenden, RI RC&D Council Inc.
Howard Cohen, RIEDC
Marilyn Cohen, ToNK

EPA Comments on the Navy Response to Comments Included in the Final Basewide Ground Water Inorganics Study Report

General Comments:

The Navy was responsive to all technical comments submitted by EPA and RIDEM with the exception of two comments (EPA Original Comments Nos. 5 and 33). An evaluation of these comments are discussed below.

Specific Comments:

Response to EPA Original Comment No. 5. It appears from the Navy responses that there is a misunderstanding between two issues. In EPA Original Comments 3 and 4, EPA questioned the utilization of several wells which contained detectable concentrations of VOCs (MW-Z3-1 and MW-Z3-2) or were hydrogeologically downgradient of suspected source areas (MW-Z4-1, MW-Z4-2, MW-Z3-2, MW-Z3-3, and MW-Z2-6) for use in establishing background inorganic concentrations. With respect to the issue of whether the organic contamination detected in these wells or the possibility of the downgradient locations of these wells impacting inorganic results, EPA concluded that based on the analysis enclosed in the comment letter it was acceptable for the Navy to utilize these wells for background purposes.

In EPA Original Comment 5, EPA is concerned that several wells (MW-WD-2, MW-Z3-3, MW-Z3-2, MW-Z4-1) exhibited high turbidity and should not be used in calculating background values. The Navy states that they would agree to not include these wells, but based on EPA's response to comments 3 and 4 they will include the data. The problem is that there are two separate issues here, 1) whether site contamination (specifically VOC contamination) is affecting the inorganic analysis, and 2) whether turbidity is affecting the inorganics concentrations in the wells. The Navy appears to be utilizing the EPA response to issue 1 to justify issue 2. Although three of the four wells cited for having high turbidity are also included in the wells in issue 1, the turbid well with the most significant impact (MW-WD-2) is not one of those wells. It appears from the data presented in the report that the turbid wells (specifically MW-WD-2) have a significant impact on the inorganics concentrations. An analysis of the data presented in Tables 7-2 and 7-4 reveals the following facts:

1 There are a total of 23 analytes for which background concentrations are being established. The maximum detected concentration of an analyte was established in the four turbid wells cited above for eleven out of the twenty three analytes. In fact, one turbid well (MW-WD-2) established the maximum concentration for ten of the twenty three analytes. Therefore the 4 turbid wells (23% of the total background wells) accounted for establishing 47% of the maximum concentrations. Even more significantly, one turbid well (MW-WD-2), which represents 6% of the total background wells, accounted for establishing 43% of

the maximum detected concentrations.

2. The Table below summarizes particular data comparing turbid versus non-turbid wells. In the 11 instances in which the four turbid wells established the maximum detected concentration for a particular analyte, more than one turbid well had higher concentrations than the other 13 wells in eight of the eleven instances. Additionally, what is evident from the last column in the table below is that in the cases where the turbid wells do establish the maximum detected concentration, the concentrations identified in the turbid wells are significantly higher than the maximum concentration established in the other thirteen wells. In five of the wells the concentrations in the turbid well was more than two times greater than that of the highest non-turbid well. In one instance aluminum, is more than three times greater than the concentration than that of the highest non-turbid well. What is apparent from this table is that the turbidity is affecting these wells, and in particular, MW-WD-2.

Analyte	No. Of Turbid Wells above Maximum Conc. Detected in other wells	Highest Turbid Well	Maximum Detected Conc. In Turbid Wells (A)	Maximum Detected Conc. In Other Wells (B)	Percent (A) Greater than (B)
Aluminum	2	MW-WD-2	13200	3560	271%
Barium	2	MW-WD-2	80.5	38.6	108%
Beryllium	1	MW-WD-2	1.3	1	30%
Cobalt	1	MW-WD-2	24.9	21.2	17%
Copper	2	MW-WD-2	25.8	9	186%
Lead	2	MW-WD-2	4.8	2.7	78%
Magnesium	2	MW-WD-2	9290	5510	69%
Potassium	1	MW-WD-2	8730	7020	24%
Sodium	2	MW-Z4-1	17900	13100	37%
Vanadium	2	MW-WD-2	24.4	9	171%
Zinc	2	MW-WD-2	89.9	39.8	126%

EPA Comments on the Navy Response to Comments Included in the Final Basewide Ground Water Inorganics Study Report

Based on the data cited in the above specific comments, it appears that the turbid wells do have a significant impact on establishing the background concentration, even in instances where the 95% Upper Confidence limit is utilized because of the significant disparity in the maximum concentration in the turbid wells and the non-turbid wells. From the data presented above and cited in the Baseline report, it appears that MW-WD-2 is having a significant impact in the establishment of background concentrations, (establishing 10 of the 23 maximum analyte concentrations.

However, due to the use of low flow sampling during this investigation, EPA has determined that the turbidity encountered at MW-WD-2 is naturally occurring and the maximum analytes encountered are representative of the turbid groundwater in this area.

Response to EPA Comment 33. The comment specifically refers to Table 7-4 in the Final report. The comment requested that additional data be included in the Table (average and geometric means, standard deviation, etc). Additionally, in instances where a contaminant was not detected, EPA requested that half the detection limit be utilized for statistical analysis. Table 7-4 does include the new data requested and clarifiers at the bottom explaining how some of the data was generated. There are several concerns with Table 7-4 and the establishment of the background concentration, specifically with Antimony and Silver.

EPA requested that for analytes that were non-detect, half of the detection limit was to be utilized for statistical analysis. For both analytes, no concentration was detected in any well above the instrument detection level, or if it was detected, was flagged with a "B" which indicates that the concentration was between the instrument detection limit and the Contract Required Detection Limit (CRDL). In the case of silver, no concentrations were detected above the Instrument Detection Limit (IDL) of 1 ug/l. The report utilizes the IDL as the maximum concentration detected (Table 7-2) and establishes the background concentration with this value. Additionally, Table 7-4 indicates that the "average" concentration for silver is 1 ug/l. This indicates the use of "half the detection limit" for instances of non-detects was not applied to silver.

The inconsistency for antimony is similar to silver, but has some unique differences. Table 7-1 in the report utilizes the maximum instrument detection limit for antimony as the maximum concentration detected (12 ug/l). The concern is that antimony actually had different detection limits, in some instances it was 1 ug/l, in other instances it was 12 ug/l. In instances where the IDL was 1 ug/l, antimony was actually detected, although slightly above the IDL, but below the CRDL. In the instances where the IDL was 12 ug/l, antimony was non-detect. The report is utilizing the highest IDL as the maximum concentration detected and establishing the background concentration based on this IDL. The concern is that the MCL for antimony is 6 ug/l, half that proposed as the background concentration which was based on the IDL. Additionally, it does not

appear that the request to utilize "half the detection limit" for instances for non-detects was applied. It is recommended that analytical concentrations detected between the IDL and CRDL be used to establish the maximum detected concentrations. The utilization of an inflated IDL (12 ug/l) which is twice the MCL does not appear to be appropriate when detected concentrations were observed.

As a result of the above mentioned inconsistencies, it appears that the background concentrations for silver and antimony are erroneous. Of particular concern is the background concentration for antimony which is double the MCL for antimony.

Therefore, the proposed background concentration for silver should be 0.5 ug/l and the proposed background concentration for Antimony should be 6 ug/l.

The following is a table of background values based on the use of ½ the detection limit for analytes not detected across NCBC, as was requested by EPA in previous comments. Please make the appropriate changes in the table 7-4.

Building 111 Lead Dust Clean up - Phil Otis said that the Navy was negotiating with the RAC contractor Foster Wheeler to clean up lead dust at the former indoor pistol range, and that work should be done in mid Fall. Bob Krivinskas, the former RPM at Davisville succeeded in opening the locked door in one portion of the building. This portion of the building could not be accessed during the Phase II EBS. RIEDC expressed interest in seeing the work proceed because they want to use the building.

Status of IR Program Sites

Site 07 Draft Remedial Investigation - Jim Shultz, EA Engineering, Science, and Technology, updated the RAB on the Phase III Site 07 RI at Calf Pasture Point, which focussed on the presence and distribution of chlorinated VOC in ground water associated with the burial of DANC prior to 1972. The Phase III RI field program proceeded in stages, which included geophysical investigation, ground water sampling through hydroprobes, field screening with an onsite mobile laboratory, and monitoring well installation, development, and sampling. Mr. Shultz emphasized that the BCT was involved and provided input throughout. The draft Phase III RI report will be submitted on schedule tomorrow (16 August) to the BCT for review and comment.

There appear to be two sources of chlorinated VOC in ground water, one near the reported DANC disposal area, and one further south. Mr. Shultz provided a summary of the hydrogeology, ground-water quality, and modeling results.

The VOC in ground water does not currently appear to present risk to human or ecological receptors, except as follows. The Human Health Risk Assessment results indicate that there are unacceptable risks associated with drinking or showering with ground water from the deep ground water at the Site. Ground water beneath Site 07 is not presently used for this purpose, nor is it required for the planned future use of the Site as a conservation area. Risks related to eating shellfish were identified by the Marine Ecological Risk Assessment of Allen Harbor. However, the shellfish risks were not associated with VOC, the constituents of concern at Site 07. Modeling results indicate that the plume does not appear to negatively impact adjacent surface water or sediments. Recommendations will include long term monitoring.

Site 02 Battery Acid Room in Building 224 - Mr. Otis provided an update on the removal action at this site. The removal work is complete. Three wells will be abandoned tomorrow, and the area scheduled to be repaved on 19 August. The removal action close-out report should be available at the end of September.

Site 13 PCB Soil Removal - Mr. Otis stated that soils containing PCB greater than 50 ppm have been removed. There are some sidewall locations where PCB concentrations range from 10 to 50 ppm. The work should be completed in 10-14 days. A contract for soil disposal is now in place with a landfill in New Hampshire.
Study Area 04 - The asphalt removal at this site has been postponed until the weather is cooler and the asphalt becomes a hardened mass again. The asphalt is difficult to manage in the hot weather.

Site 03 and the Nike Site - EA installed 9 new wells around the Nike Site. Based on field screening data, some chlorinated VOC were detected in ground-water samples collected from all the wells. The highest concentrations are near the original source area (which is located near a concrete pad that was used both by Peabody Clean Industries and the Nike Site. The nine wells have been developed. The work plan will be revised to include sampling for parameters that can be used to evaluate the intrinsic bioremediation of the VOC through natural attenuation. Research by Frank Chapelle of the USGS and others have shown that the potential presence of natural attenuation can be assessed by evaluation of ground-water sample results. Mr. Otis indicated that the sampling has been postponed, and that a revised work plan which would include natural attenuation parameters would be available for the BCT next week. RIEDC wanted to know if the screening data suggested that VOC in ground water were moving offsite at concentrations exceeding MCLs? Mr. Otis said yes. A discussion ensued about whether private wells could potentially be impacted by ground water from the Nike Site, and what monitoring and safeguards would be required if a natural attenuation remedy were emplaced. Christine Williams mentioned that EPA had a new draft guidance document for evaluating the effectiveness of a remedy. Generally two to three years of monitoring data were required to demonstrate the effectiveness of a given remedy. Jim Shultz requested a copy of the guidance document, and Christine Williams agreed to provide it.

Site 09 Allen Harbor Landfill - The revised Draft Final PRAP was submitted 2 August 1996. The town of North Kingstown and their consultants DOCKO, Inc are evaluating samples of the potential dredge material from Allen Harbor. The town is planning to dredge the entrance of Allen Harbor in order to increase boating access to the harbor. They have collected five sediment samples which were analyzed for chemical and physical parameters.

Potentially, if the Navy could avoid bringing in clean borrow from an offsite source and save money by using some or all of the dredge material, it would consider applying the costs saved toward the dredging project. At the request of Northern Division, EA has prepared a preliminary Dredged Sediment Evaluation Report, which Mr. Otis provided to EPA and RIDEM at the meeting. The goal of the evaluation is to assess whether dredge material is suitable to be used in the capping of the landfill or creation of shoreline wetlands. The preliminary report concludes that based on the limited available information (5 samples), the sediment would be physically and chemically suited for use in capping the landfill or in creation of the wetlands provided it were mixed with organic material. Additionally, the dredged sediment will need to be dewatered (Calf Pasture Point, Site 09, and the beach at Spink Neck have been considered as potential locations for the dewatering activity).

Richard Gottlieb (RIDEM) indicated that the State is also evaluating the physical properties data for the five sediment samples. The Town stated that it would like to dredge as soon as this winter; and indicated that it may be very ambitious to come to consensus on this issue, and deal with the design and permitting aspects so quickly. Furthermore, the Town has contacted the Department of the Interior about the possibility of obtaining the Allen Harbor Landfill site after it is capped. The Town wanted to know if the cap could be designed so that it could be used for recreation (such as bike paths, ball fields), because it would offer excellent views of the harbor. The Navy, EPA, RIDEM, and the Town agreed to meet on 18

September to discuss the Town's ideas about the long term use of the Site 09 property, and the dredge material issue.

The Navy indicated that it was waiting for comments on the redlined draft Final Site 09 FS report that was submitted in July. EPA stated that it will provide comments to the Navy by August 26. RIDEM stated that it will provide comments on the Site 09 FS and the PRAP by 2 September.

Resident Paul Burns ask for a summary of the proposed action for the landfill. Phil Otis indicated that the plan (PRAP) called for a RCRA C Cap (with an impermeable liner), a rock revetment for seaward stabilization, wetland construction along the toe of the revetment, and further study for ground water.

Basewide Ground-Water Study- The Navy had received EPA comments on the redlined Draft Final Basewide Ground Water Inorganics Study report. EPA recommended a statistical analysis of background data which is to be incorporated into the report. The revised scheduled due date for this report is now 9 September 1996. Based on this background study, the Navy is looking at ground water basewide, and anticipates that the evaluation will support a no further action ROD at most locations for next July. The ROD must be signed before parcels of land can be transferred.

Schedules - The BCT has signed a consensus statement on the revised schedule for Site 09 and Site 07. There will also have to be a revision to the Site 03/Nike Site schedule to accommodate assessment of natural attenuation. Christine Williams requested that a FACT Sheet addressing and consolidating these changes to the Federal Facility Agreement schedule be prepared.

The meeting was adjourned at 9:40 PM.

The next RAB meeting was scheduled for 10 October 1996.

APPENDIX A

AGENDA

NCBC DAVISVILLE

18th RESTORATION ADVISORY BOARD MEETING

THURSDAY, 15 AUGUST 1996, 7:00 P.M.

BLDG 404, CARETAKER SITE OFFICE

AGENDA

Status of Compliance Items

- Progress and Schedule of EBS Phase II Review Item Investigations
  - Summary of Findings
  - Summary of Recommendations
- Other Removal/Cleanup Actions by RAC
  - Unsafe Building Demolition
  - Camp Fogarty Debris Removal
  - Building 111 Lead Dust Cleanup

Status of IR Program

- Site 07 - Draft Remedial Investigation
  - Summary of Findings
- Sites 02 & 13 and Study Area 04 Removal Action Plans
  - Site 2 Status of Completion
  - Site 13 Status of Removal
  - Study Area 04
- Site 03 - NIKE Site Source Investigation
- Site 09 Allen Harbor Landfill:
  - Draft Proposed Remedial Action Plan (PRAP)
  - Evaluation of Material to be Dredged from Allen Harbor Entrance
- Sites 6, 10 and 11 Draft PRAP for NFA
- Ground Water Study
- IR Program Schedules

Ground Water Evaluation
NCBC Davisville, RI

DRAFT

Prepared for:

Department of the Navy
Northern Division
Naval Facilities Engineering Command
Lester, Pennsylvania

Prepared by:

Stone & Webster Environmental
Technology & Services
Boston, Massachusetts

Under contract with:

EA Engineering, Science, and Technology
Sparks, Maryland

08 October 1996
Contract No. N62472-92-D-1296
Contract Task Order No. 0028

ES.0 EXECUTIVE SUMMARY

ES.1 PURPOSE AND SCOPE OF EVALUATION

This evaluation includes a comparison of ground water sample analyses from Installation Restoration (IR), Underground Storage Tank (UST), and Environmental Baseline Survey (EBS) investigations to background ground water chemistry levels established in the Basewide Ground Water Inorganics Study, performed by Stone & Webster in 1996. The purpose of this evaluation is to develop a conclusion in regard to the impact of Navy activities on the ground water in the Hall Creek, Mill Creek, and Sandhill Brook (West Davisville) Watersheds, at Camp Fogarty, and in the Pier Support Area (Zone 4). The project is being performed to support closure of the Naval Construction Battalion Center (NCBC) Davisville, Rhode Island.

The ground water evaluation presents a summary of previous investigations, review of regional and local geology and hydrogeology, and a comparison to background inorganic ground water chemistry values and regulatory standards for each of the aforementioned watershed areas. Ground water monitoring was performed during the Phase I and II Remedial Investigation (RI) for IR sites. Ground water monitoring for former UST locations was performed during the UST RI, select UST closure activities, the implementation of the Corrective Action Plan (CAP) for select former UST locations, and the interim ground water monitoring program at three former UST locations as requested by RIDEM. In addition, an EBS currently under review, which included ground water monitoring, was used for this evaluation. The evaluation consisted of studies and investigations for ground water in the Hall Creek, Mill Creek, and Sandhill Brook Watersheds, the Pier Support Area, and Camp Fogarty. Basewide background inorganic concentrations were established for the Main Center and West Davisville through a previous study which entailed the mapping of the potentiometric surface of NCBC Davisville, locating background wells with respect to ground water flow directions and known or suspected areas of concern, and collection and laboratory analysis of ground water samples.

ES.2 CONCLUSIONS

In general, analytical results of ground water samples collected during the various investigations, indicated either no or very low concentrations of volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and/or pesticides at most of the IR, UST, and EBS locations. No polychlorinated biphenyls (PCB) were detected in the ground water. For many samples, the detection of VOC or SVOC at low levels could be attributed to common laboratory artifacts.

Inorganic constituents detected in ground water samples occurred in a limited number of samples at several sites. Potassium, sodium, iron, magnesium, and manganese were the analytes most frequently detected above background levels. Beryllium was detected above background concentration in four Site 13 samples. There was no apparent spatial distribution of any of the analytes at any particular site.

Ground water monitoring is currently ongoing at select former UST locations in accordance with the UST program under the Rhode Island Department of Environmental Management (RIDEM).

Based on the ground water inorganic results from the twelve existing wells at Camp Fogarty, there does not appear to be an impact to inorganic ground water quality from historical Naval operations at Camp Fogarty.

ES.3 RECOMMENDATIONS

No further action, or limited action with the implementation of deed restrictions, is recommended for the ground water in the Mill Creek, Hall Creek, and Sandhill Brook (West Davisville) Watersheds, the Pier Support Area (Zone 4) and Camp Fogarty.

It is recommended, due to the low levels of constituents of concern and inorganic analyte concentrations which exceed regulatory drinking water standards, that a deed restriction prohibiting the installation of potable wells at the NCBC Davisville Main Center be imposed. Currently, ground water at the Main Center is classified by RIDEM as Class GB, ground water which is not suitable for drinking without treatment. Therefore, imposing this deed restriction should not effect ultimate commercial or industrial reuse of the site.

It is recommended that ground water associated with Site 10 should be removed from the CERCLA process and the Navy should be able to consider that this parcel was transferred to the Army with ground water quality that is within levels considered to be non-contaminated in that aquifer. Therefore, no further action is recommended for ground water at Camp Fogarty.

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE OF STUDY

Under Contract No. 62472-92-D-1296, Northern Division, Naval Facilities Engineering Command (Northern Division) issued Contract Task Order (CTO) No. 0028 to EA Engineering, Science and Technology (EA). EA has authorized Stone & Webster Environmental Technology & Services (Stone & Webster) to perform the tasks covered by this CTO. A portion of this CTO includes an evaluation of the ground water in the Hall Creek, Mill Creek, and Sandhill Brook (West Davisville) Watersheds, at Camp Fogarty, and in the Pier Support Area (Zone 4). The main center is divided into areas or zones which were established for administrative purposes for use in transferring the NCBC Davisville property. Zone 1 consists of the administrative area, Zone 2 is the warehouse area, and Zone 4 consists of the Pier Support Area. This work is being performed to support closure of the Naval Construction Battalion Center (NCBC) Davisville, Rhode Island.

This investigation includes the evaluation of ground water sample analyses from Installation Restoration (IR), Underground Storage Tank (UST), and Environmental Baseline Survey (EBS) investigations in comparison to background ground water chemistry levels established in the Basewide Ground Water Inorganics Study (ground water study), performed by Stone & Webster in 1996. The findings of this study were presented in the *Final Basewide Ground Water Inorganics Study Report - NCBC Davisville, Rhode Island*, prepared by Stone & Webster in September 1996. The purpose of this evaluation is to develop a conclusion in regard to the impact of Navy activities on the ground water.

1.2 SITE LOCATION AND DESCRIPTION

NCBC Davisville is located in the northeast section of North Kingstown, Rhode Island, approximately 18 miles south of the state capital, Providence. A portion of NCBC Davisville is adjacent to Narragansett Bay. Adjoining NCBC Davisville's southern boundary is the decommissioned Naval Air Station (NAS) Quonset Point which was transferred by the Navy to the Rhode Island Economic Development Corporation (RIEDC) during the period 1974 through 1978. A site locus map is included as Figure 1.

NCBC Davisville is composed of three areas: the Main Center, West Davisville, and Camp Fogarty, a training facility located approximately four miles west of the Main Center. Land use surrounding NCBC Davisville is predominantly residential to the north. West of the Main Center, along Route 1, development consists of shopping malls, retail stores, restaurants, and gas stations.

3.2 Local Hydrogeology

The eastern half of Zone 2 is hydrogeologically dominated by a ground water recharge area, which is centered near IR Program Site 13 (Site 13). This area is presented on Figure 3A. The shallow ground water in the overburden flows radially from this area.

To the east, ground water flows toward Davol Pond and Hall Creek, which borders the east side of Zone 2 and connects Davol Pond to Frys Pond. To the north and west section of Zone 2, the shallow ground water appears to flow toward Mill Creek. The divide between the Hall Creek drainage basin and the Mill Creek drainage basin is not well defined but appears to be in a north-south direction in the eastern area of Zone 2.

In the southeast corner of Zone 2, bedrock is present above the water table. Bedrock can act as a flow barrier and divert water toward the east and west, or transmit water in the same radial direction as shown in the overburden. Most likely, a combination of both flow patterns exists.

The same flow patterns exist for the deep well ground water contour as shown for the shallow well ground water contour. This, together with the geologic data indicate that the overburden in Zones 1 and 2 acts as one hydrogeologic unit. These zones are shown on Figures 2 and 3A.

As shown on Figure 3B, Zone 4 ground water flows in an easterly direction toward Narragansett Bay. Bedrock does not appear to influence the ground water flow patterns in Zone 4.

3.3 Background Ground Water Chemistry

Basewide background inorganic concentrations were established for the Main Center and West Davisville through a previous study which entailed the mapping of the potentiometric surface of NCBC Davisville, locating background wells with respect to ground water flow directions and known or suspected areas of concern, collection and laboratory analysis of ground water samples. The findings of this study were presented in the *Final Basewide Ground Water Inorganics Study Report - NCBC Davisville, Rhode Island*, prepared by Stone & Webster in September 1996.

One of the primary objectives of the ground water study conducted at the Main Center and West Davisville was to establish background inorganic ground water chemistry and to determine a single set of background values. Background conditions are defined for the purposes of the study as conditions which have not been affected by historical operations at NCBC Davisville.

The background inorganic ground water chemistry was assessed by analyzing water samples for Target Analyte List (TAL) metals. Concentrations of inorganic analytes in ground water may be controlled by environmental factors such as aquifer composition, ground water recharge sources, and ground water flow patterns. Background monitoring well locations were selected to provide representation of both upland and lowland environments, while avoiding areas of known historical operations. Analytical results of the inorganic analyses are presented in Table 3.3-1.

Monitoring wells were located to be upgradient or cross-gradient from IR and UST sites. When this was not possible, downgradient distance from the IR or UST site was maximized.

All ground water samples were analyzed for volatile organic compounds (VOC) and semivolatile organic compounds (SVOC). The presence of either VOC or SVOC may indicate that ground water at the particular monitoring well location may be impacted by anthropogenic activities.

A total of seventeen background monitoring wells were installed. VOC were detected in two of the wells and the data obtained from the analysis was deleted from the data base used to determine background levels.

Analytical results of the background well samples were grouped by watershed and the groups were compared. No significant difference in detected inorganic concentrations among the watersheds was apparent. Therefore, all data was analyzed as one set.

Table 3.3-2 presents the background inorganic chemistry as determined by this study. The value for each individual analyte is based on the more conservative value of the maximum detected concentration or the 95% upper confidence limit (UCL) from a data set of inorganic analyses of ground water samples collected from NCBC Davisville background wells.

3.4 Installation Restoration (IR) Program Sites

Four IR Program Sites (05, 06, 11, and 13) are located within the area of evaluation. Site history, results of previous studies, ground water monitoring results, and recommendations for future actions are presented for each IR Program Site included in this evaluation. The results of ground water monitoring were used to assess the condition of the ground water at each location. The inorganic analysis results of ground water samples were compared to water quality standards and the background inorganic values as presented in the *Final Basewide Ground Water Inorganics Study Report - NCBC Davisville, Rhode Island*, prepared by Stone & Webster in September 1996.

TABLE 3.3-1 (continued)

NCBC DAVISVILLE
MAIN CENTER
BASEWIDE GROUND WATER INORGANICS STUDY

Analyte	Unit	MW-Z1-1		MW-Z1-2		MW-Z1-3		MW-Z1-4	
Aluminum	ug/L	290		113	B	264		2660	
Antimony	ug/L	1.0	U	1.5	B	1.0	U	12.0	U
Arsenic	ug/L	1.0	U	2.0	U	2.0	U	2.0	U
Barium	ug/L	13.9	B	13.5	B	12.8	B	38.6	B
Beryllium	ug/L	1.0	U	1.0	U	1.0	U	1.0	U
Cadmium	ug/L	1.0	U	1.0	U	1.0	U	3.0	U
Calcium	ug/L	27500		3490	B	5730		13200	
Chromium	ug/L	9.0	B	7.0	U	9.2	B	214	
Cobalt	ug/L	10.0	U	10.0	U	10.0	U	12.5	B
Copper	ug/L	9.0	U	9.0	U	9.0	U	9.0	U
Iron	ug/L	472		70.7	B	1030		13500	
Lead	ug/L	1.0	U	1.0	U	1.0	U	2.7	B
Magnesium	ug/L	600	B	970	B	919	B	5510	
Manganese	ug/L	15.8		28.2		90.6		1490	
Mercury	ug/L	0.20	UN	0.20	U	0.20	U	0.20	U
Nickel	ug/L	11.0	U	11.0	U	29.5	B	154	
Potassium	ug/L	3230	B	848	B	1430	B	7020	
Selenium	ug/L	1.0	UN	1.0	U	1.0	U	2.0	U
Silver	ug/L	1.0	U	1.0	UW	1.0	UW	1.0	U
Sodium	ug/L	4200	B	13100		2670	B	9040	
Thallium	ug/L	2.2	BW	2.0	U	2.0	U	2.0	U
Vanadium	ug/L	9.0	U	9.0	U	9.0	U	9.0	U
Zinc	ug/L	12.0	U	12.0	U	28.4		19.6	B

Notes:
U = Not Detected N = MS outside of control limits
B = Between IDL and CRDL E = Serial dilution outside of control limits

TABLE 3.3-1 (continued)

NCBC DAVISVILLE
MAIN CENTER
BASEWIDE GROUND WATER INORGANICS STUDY

Analyte	Unit	MW-Z2-1		MW-Z2-3		MW-Z2-4		MW-Z2-5		MW-Z2-6	
Aluminum	ug/L	586		71.0	U	527		163	B	107	B
Antimony	ug/L	2.1	B	1.9	B	2.3	B	1.4	B	1.3	B
Arsenic	ug/L	2.0	U	6.4	B	1.3	B	2.0	U	2.0	U
Barium	ug/L	14.0	B	18.4	B	37.5	B	11.0	U	21.7	B
Beryllium	ug/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Cadmium	ug/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Calcium	ug/L	8420		12600		6810		2430	B	3710	B
Chromium	ug/L	7.6	B	7.0	U	7.0	U	8.1	B	7.0	U
Cobalt	ug/L	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U
Copper	ug/L	9.0	U	9.0	U	9.0	U	9.0	U	9.0	U
Iron	ug/L	1660		25500		43.3	B	336		6030	
Lead	ug/L	1.1	B	1.0	U	1.0	U	1.0	U	1.0	U
Magnesium	ug/L	1380	B	3250	B	908	B	980	B	1070	B
Manganese	ug/L	85.6		4300		199		281		838	
Mercury	ug/L	0.20	U	0.20	UN	0.20	UN	0.20	U	0.20	U
Nickel	ug/L	11.7	B	15.8	B	11.0	U	20.8	B	22.2	B
Potassium	ug/L	2010	B	3090	B	1700	B	2480	B	1560	B
Selenium	ug/L	1.0	U	1.8	BN	1.0	UN	1.0	U	1.0	U
Silver	ug/L	1.0	UW	1.0	U	1.0	U	1.0	UW	1.0	UW
Sodium	ug/L	10700		8730		4340	B	5000		4610	B
Thallium	ug/L	2.0	U	2.2	B	4.1	B	2.0	U	2.0	U
Vanadium	ug/L	9.0	U	9.0	U	9.0	U	9.0	U	9.0	U
Zinc	ug/L	12.0	U	12.0	U	12.0	U	12.0	U	23.0	

Notes:
U = Not Detected N = MS outside of control limits
B = Between IDL and CRDL E = Serial dilution outside of control limits

TABLE 3.3-1 (continued)

NCBC DAVISVILLE
MAIN CENTER
BASEWIDE GROUND WATER INORGANICS STUDY

Analyte	Unit	MW-Z3-1		MW-Z3-2		MW-Z3-3		MW-Z4-1		MW-Z4-2	
Aluminum	ug/L	71.0	U	5920		979		2640		164	B
Antimony	ug/L	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U
Arsenic	ug/L	2.0	UN	4.9	BNW	2.0	UN	2.7	BNW	2.0	U
Barium	ug/L	15.0	B	39.3	B	33.2	B	33.6	B	19.1	B
Beryllium	ug/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Cadmium	ug/L	1.0	U	1.8		1.0	U	1.1	B	3.0	U
Calcium	ug/L	11500		19800		14400		12400		15000	
Chromium	ug/L	7.0	U	43.4		16.7		78.2		7.0	U
Cobalt	ug/L	21.2	B	12.2	B	10.0	U	10.0	U	10.0	U
Copper	ug/L	9.0	U	10.8	B	9.0	U	9.0	U	9.0	U
Iron	ug/L	15200		25400		15200		13100		6030	
Lead	ug/L	1.0	U	3.5		1.0	U	1.2	B	1.0	U
Magnesium	ug/L	3840	B	5920		4390	B	4380	B	2940	B
Manganese	ug/L	777		824		1010		1350		990	
Mercury	ug/L	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	ug/L	19.2	B	39.4	B	16.0	B	53.3		5.0	U
Potassium	ug/L	2050	B	1410	B	2500	B	3220	B	2470	B
Selenium	ug/L	1.0	UN	1.0	UN	1.0	UN	1.0	UNW	2.0	UW
Silver	ug/L	1.0	UNW	1.0	UNW	1.0	UNW	1.0	UNW	1.0	UW
Sodium	ug/L	9640		7470		15100		17900		12200	
Thallium	ug/L	1.0	U	1.0	U	1.0	U	1.0	U	2.0	U
Vanadium	ug/L	9.0	U	13.2	B	9.0	U	9.0	U	9.0	U
Zinc	ug/L	25.8		69.5		50.0		26.5		12.0	U

Notes:
U = Not Detected N = MS outside of control limits
B = Between IDL and CRDL E = Serial dilution outside of control limits

TABLE 3.3-2

NCBC DAVISVILLE
BACKGROUND INORGANIC GROUND WATER VALUES
MAIN CENTER AND WEST DAVISVILLE

		Average Concentration					Regulatory Standards			
Analyte	Units	Arithmetic	Geometric	Standard Deviation	Proposed Background Value	Origin of Background Value	MCL	SMCL	RI	EPA Region III RBC
Aluminum	ug/L	1845	466	3253	5315	95% UCL	NA	200	NA	37000
Antimony	ug/L	3.8	2.9	2.3	12	#	6	NA	NA	15
Arsenic	ug/L	1.6	1.3	1.5	6.4	MW-Z2-3	50	NA	50	11
Barium	ug/L	25.5	20.4	17.6	80.5	MW-WD-2	2000	NA	2000	2600
Beryllium	ug/L	0.6	0.5	0.19	1.3	MW-WD-2	4	NA	NA	0.016
Cadmium	ug/L	0.9	0.7	0.5	3	###	5	NA	5	18
Calcium	ug/L	10489	8432	6468	13302	95% UCL	NA	NA	NA	NA
Chromium	ug/L	39	12	64	214	MW-Z1-4	100	NA	100	37000
Cobalt	ug/L	8.0	6.7	6.0	24.9	MW-Z3-1	NA	NA	NA	2200
Copper	ug/L	6.1	5.3	5.1	25.8	MW-WD-2	NA	1000	NA	1500
Iron	ug/L	8853	2589	9175	25500	MW-Z2-3	NA	300	NA	11000
Lead	ug/L	1.2	0.8	1.3	4.8	MW-WD-2	15.00	NA	15	NA
Magnesium	ug/L	2850	2006	2371	5126	95% UCL	NA	NA	NA	NA
Manganese	ug/L	937	390	1146	3292	95% UCL	NA	50	NA	180
Mercury	ug/L	0.2	0.2	0	ND(0.2)	ALL 17 WELLS	2	NA	2	11
Nickel	ug/L	35	18	46	154	MW-Z1-4	NA	NA	NA	730
Potassium	ug/L	2688	2159	2057	3843	95% UCL	NA	NA	NA	NA
Selenium	ug/L	1	1	0.5	2.2	MW-WD-3	50	NA	50	180
Silver	ug/L	1	1	0	1	##	NA	100	NA	180
Sodium	ug/L	8748	7542	4348	12346	95% UCL	NA	NA	NA	NA
Thallium	ug/L	1.2	0.9	0.9	4.1	MW-Z2-4	2	NA	NA	NA
Vanadium	ug/L	6.18	5.30	4.99	24.4	MW-WD-2	NA	NA	NA	260
Zinc	ug/L	24.7	15.5	24.2	89.9	MW-WD-2	NA	5000	NA	11000

Notes:
NA - not applicable
Proposed background value determined from the data set of NCBC background wells.
Shaded area indicates proposed background inorganic values.
Origin of Background Value - all background values are based on the more conservative of the 95% UCL or the maximum detected concentration.
- MW-Z1-4, MW-Z3-1, MW-Z4-2, MW-WD-1, MW-WD-3
- MW-Z1-1, MW-Z1-2, MW-Z1-3, MW-Z1-4, MW-Z2-1, MW-Z2-3, MW-Z2-4, MW-Z2-5, MW-Z2-6, MW-Z3-1, MW-Z4-2, MW-WD-1, MW-WD-3
- MW-Z1-4, MW-Z4-2, MW-WD-3
For statistical analysis, half of the detection limit was used for an analyte that was not detected.

Comments on Groundwater Evaluation Report.

NOV 13 '96 04:22PM NORTHDIV ENVIRONMENT

N62578.AR.000744
NCBC DAVISVILLE
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COR 11/00/96

add to Att B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203-0001

November 8, 1996

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To LINDA GARDNER	From PHIL OTIS
Co. SWEC	Co. NAVFACENGCOM-1
Dept.	Phone # (610) 595-0567 x 113
Fax # (617) 589-2922	Fax # (610) 595-0555

Mr. Philip Otis
U.S. Department of the Navy
Northern Division - NAVFAC
10 Industrial Highway
Code 1811/PO - Mail Stop 82
Lester, PA 19113-2090

Re: Review of Draft Ground Water Evaluation Report, dated 8 October 1996, at the former Naval Construction Battalion Center (NCBC) - Davisville, Rhode Island

Dear Mr. Otis:

Pursuant to § 7.6 of the NCBC Federal Facility Agreement (FFA), the Environmental Protection Agency's (EPA) has reviewed the above referenced document. Please find our comments enclosed.

This evaluation is a good first cut at bringing together all the information available on the level of contamination in the NCBC Site groundwater. However, more coordination is needed between the various sources of the information to produce a coherent report that will facilitate cleanup decisions. A map for each watershed that shows the various sources and the groundwater contamination will provide a much needed wrap-up of the data provided in this report. The enclosed comments provide more suggestions on how to evaluate the various sources and the available data.

If you have any questions with regard to this letter, please contact me at (617) 573-5736.

Sincerely,

Christine A.P. Williams, RPM
Federal Facilities Superfund Section

Enclosure

cc: Richard Gottlieb, RIDEM
Walter Davis, CSO
Bill Brandon, EPA
Bryan Wolfenden, RI RC&D Council Inc.
Howard Cohen, RIEDC
Susan Licardi, ToNK
George Horvat, Dynamac
Jim Shultz, EA

EPA Review of the Draft Ground Water Evaluation Report

GENERAL COMMENTS:

1. This report lacks summary evaluation figures and tables. Watershed contaminant summary figures should be developed with "summary boxes" of all contaminants found at levels above non-restricted use risks at the locations detected. The same type of figures should also be developed for all contaminants detected above commercial/industrial risk levels. There should also be watershed wide summary data tables that would go along with these figures that compare the levels of contaminants detected to the M.C.L. and/or other risk based criteria. These summary tables and associated figures would speed review of the large amount of data provided in this report.

2. The report lacks continuity. The report contains are a lot of data from discreet locations and no attempt to tie the information together. The evaluation of the above requested figures would start to provide the continuity need for a basewide groundwater operable unit.

3. Throughout the document low levels of acetone, toluene, 2-butanone, carbon tetrachloride, chloroform, methylene chloride, bis(2-ethylhexyl)phthalate (BEHP), and other organic compounds are referred to as laboratory contaminants. Does the field and laboratory blank data support this conclusion? Did the data undergo data validation to determine that these contaminants are laboratory contaminants and are not present at the site? If the data does support the presences of laboratory contaminants, state where this data can be located.

Please clarify the text so that the reader will be able to verify the statements made throughout the document that the low levels of organic compounds are in fact laboratory or field methodology induced contamination and not real existing contamination. An evaluation of the data validation which occurred for those specific sampling events should be performed, specifically concentrating on the method and laboratory blanks, to determine whether these contaminants actually are attributable to laboratory contamination. These or similar comments have been made in past reviews. The Navy should provide back up justification for all conclusionary statements made in the report.

4. The document is unclear on how the analytical data and field procedures were reviewed. Were the same review criteria used for all investigations? Were the same analytical methods and sampling procedures used? If not, how would the differences in the field/analytical methods impact the data.

5. Verify that all contaminated dirt has been removed from the LUST sites. If not removed this dirt could be a continuing source and impact the ground water.

6. The relationship of the consistency and usability of data that, between all the various sampling methods used and the various sampling rounds during differing parts of the year, is being used to

EPA Review of the Draft Ground Water Evaluation Report

evaluate the overall NCBC groundwater should be made clear. Is all the data reported usable and does it show a true pattern of no risk? Are there any chemical changes occurring across the site? How does the hydraulic system behave on a large scale?

7. Throughout the report inorganic analytical data are compared to inorganic background levels established in the "*Basewide Ground Water Inorganic Study Report, NCBC Davisville, Rhode Island*" dated 06 September 1996. EPA provided comments on this final report in a letter from Christine Williams (EPA) to Phil Otis (NAVFAC) dated 01 October 1996 which suggested a revision of several of the inorganic background concentrations, specifically antimony, mercury, and silver; however these concentrations were not revised in this report. Therefore, a re-evaluation needs to be performed in light of the revised background concentration of antimony only, since the e-mailed response from the Navy dated 10-17-96 was sufficient for both mercury and silver.

8. The report is not clear in identifying which areas of the NCBC Davisville site were considered in this evaluation. The Executive Summary indicates that Installation Restoration sites were included as part of this evaluation; however, IR sites 02, 03, 07, 09, 14 and Study areas 01, 04, 15, and Calf Pasture Point groundwater data was not evaluated The report should be revised to clearly reflect the scope of the investigation.

9. It would be helpful to the reader to have a map showing total contaminant concentration at each sampling location and depth in the document. This map would give an overall perspective of where the contaminants are located and would support the conclusions in the document.

10. The on going ground water monitoring at selected former UST locations in accordance with the UST program under RIDEM needs to be further identified and evaluated for its impacts on the IR & EBS & ecological risks at the Site.

SPECIFIC COMMENTS

11. Page 1 - 2, § ES.2, Conclusions, this section states "For many samples, the detection of VOC or SVOC at low levels could be attributed to common laboratory artifacts.". Do the field and laboratory blanks support this conclusion?

12. Page 13, § 3.1, Local Geology, ¶3; should the zone 2 fill area referenced be at Site 13 or was Site 11 also a swamp?

13 Page 14, § 3.2, Local Hydrogeology, ¶2; please reference the map that shows this divide.

14 Section 3.3, Background Ground Water Chemistry, Page 15, Para. 4. The report indicates

that although there were seventeen background monitoring wells drilled, only fifteen were used in the determination of background inorganic contamination due to the presence of VOC contamination in two wells. It is our understanding that the Navy determined, and EPA agreed, the VOC contamination in the two wells had minimal effect on the inorganic constituents and therefore should be utilized in the background inorganic analysis. It is recommended that the inorganic data from all seventeen wells be used to establish the background inorganic concentrations.

15. Section 3.3, Background Ground Water Chemistry, Page 15, Para. 5. The report indicates that a comparison of inorganic analyses for background wells by watershed was conducted (referring to the Basewide Ground Water Inorganics Study Report) and that no significant differences were noted, therefore the results were analyzed as one data set. In neither the Basewide Inorganics report or this report is there any analysis justifying this determination, nor has the criteria been stated which would constitute no significant variance between watersheds. Please reference the EPA analysis that justifies this determination.

16. Page 17, §3.4.1, Site Description and History, top of page; the last sentence in this paragraph states that no ground water monitoring was performed and the last sentence in the second paragraph says that no evidence of groundwater contamination at the site, this apparent contradiction does not seem reasonable, please clarify text. Perhaps if the overall larger picture was developed for the watershed, the Navy could develop a reasonable explanation as to why the Navy feels that there is no risk due to groundwater exposure at the site.

17. Section 3.4.1.2, IR Site 05, Page 17, Conclusions and Recommendations. The report indicates that no further action is recommended because there is no evidence of organic or inorganic contamination in groundwater. However, since elevated levels of pesticides were detected in the soil, and no groundwater data has been presented, the conclusion for no further action appears to be premature. At a minimum several additional groundwater samples should be collected before a conclusion is made on the condition of groundwater.

18. Page 19, §3.4 2.1, Site Description and History, Bullet #2; the sample validation should be referenced that indicates that these contaminants are not site related.

19. Page 20, §3.4.2.2, Ground water Monitoring Results ¶3; spell out BEHP the first time it is used. Also, a reference to the sample validation that found BEHP in the laboratory blanks should be inserted here.

20. Page 21, §3.4.2.2, Results of Inorganic Analysis, ¶2; once the M.C.L. or the background concentration has been exceeded for an inorganic contaminant, the Navy should reference the risk assessment done for residential ingestion of groundwater to show whether or not there is a risk associated with the ingestion of these compounds.

EPA Review of the Draft Ground Water Evaluation Report

21. Page 21, §3.4.2.2, Results of Inorganic Analysis, ¶2 and Page 25; the Navy should determine if the anomaly was indeed a laboratory reporting error.

22. Page 21, §3.4.2.3, Conclusions and Recommendations; the groundwater classification of GB does not in itself require deed restrictions, the recommendation of deed restrictions should be made when the site specific contaminant levels in groundwater would poses a risk to the receptor's unrestricted use of the groundwater.

23. Page 23, Bullet 6; validation information should be referenced to verify this issue.

24. Section 3.4.3.2, IR Site 11, Page 25, Results of SVOC Analysis. Phenol was detected at 1 ug/l in 11-MW9D. A discussion of the phenol concentrations in this well should be presented in the text.

25. Page 26, §3.4.3 3, Conclusions and Recommendations; if the contaminants are above background and MCLs, the Navy should reference the risk assessment done to determine if the contaminant levels pose a risk.

26. Section 3.4.4.2, Page 31, IR Site 13, Results of SVOC Analysis. According to Table 3.4-5, during the Phase I sampling bis (2-ethylhexyl) phthalate was detected at a concentration of 45 ug/l. A discussion of this data should be incorporated into the text. Additionally, the text indicates that bis(2-chloromethyl)ether was detected at 2 ppb and 3 ppb in two of the samples collected during the Phase II RI. However, according to Table 3.4-6, the actual contaminant detected at those concentrations was phenol. The discussion should be modified to correct this apparent inconsistency.

27. Section 3.4.4.2, Page 31, IR Site 13, Results of PCB/Pesticide Analysis. According to Table 3 4-6, alpha chlordane was detected in 13-MW16S (dup) at a concentration of 0.0074 ug/l. A discussion of the alpha chlordane concentrations should be included in the text.

28. Section 3.4 4.2, Page 31, IR Site 13, Results of Inorganic Analysis. The report states that lead was not detected in any of the Phase II groundwater samples However, according to Table 3.4-6, well number 13-MW11S exhibited a lead concentration of 2.2 ug/l. The discussion should be modified to correct this inconsistency.

29 Page 31, § 3.4.4.2, Ground Water Monitoring Results; results of Inorganic Analysis; there needs to be a discussion on the significant differences between the ground water sampling procedures used during Phase I and Phase II RI. This needs to follow the statement "This is primarily due to sampling methods".

EPA Review of the Draft Ground Water Evaluation Report

30. Page 33, §3.4.3.3, Conclusions and Recommendations; if the contaminants are above background and MCLs, the Navy should reference the risk assessment done to determine if the contaminant levels pose a risk.

31. Page 33, §3.5.1.1, Description and History; was the rust remover an emulsified or dissolved material? The emulsified material would have been a water based material and would not have shown up in a 418.1 test.

32. Section 3.5.1.2, Page 34, Former UST 3, Ground Water Monitoring Results. The description and history of this site indicates that the tank contained "rust remover". Sampling conducted at this site consisted of a groundwater sample analyzed for TPH. Although the exact constituents of the rust remover used at the site cannot be determined, typically rust removing liquids are caustic or acidic, not petroleum based. During the Environmental Baseline Survey a floor drain sample collected from the Item 3 source area exhibited elevated metals concentrations which are consistent with the expected contaminants generated during typical rust removal operations. Efforts to further explore the relationship of this UST with EBS Item 3 source area should be considered. Further sampling may be warranted in order to confirm or refute the presence of contamination from the rust removal operations.

33. Page 38, §3.5.5, ¶3; The location of this UST seems to be upgradient of Site 6 and so therefore may impact site 6. Please revise.

34. Page 41, §3.5.7; add the location of the UST to Figure 3B.

35. Page 44, §3.5.11; add the location of the UST to Figure 3B.

36. Page 45, §3.5.12.2, Ground Water Monitoring Results, last ¶; the 1,2-Dichloroethene was found at 72 pbb which is above the M.C.L., which is not a low level. Remove the words "low levels" and replace with the actual results of the first sampling round.

37. Page 45, §3.5.13; what are the recommendations for this site?

38. Section 3.5.12.2, Page 46, Former UST 56, Ground Water Monitoring Results. The narrative discussion states that 1,2-DCE was detected at concentrations of 5 and 59 ppb. However, Table 3.5-3 only indicates a concentration of 59 ppb. This apparent inconsistency should be evaluated and the text or table should be modified accordingly.

39. Section 3.5.13.2, Page 47, UST 58, Ground Water Monitoring Results. The groundwater results indicate the presence of elevated levels of TPH; however, the discussion does not present a recommendation concerning the groundwater contamination. The text should be modified to include a discussion regarding the additional investigative activities required to adequately identify

the source of this contamination and delineate its extent.

40. Section 3.5.14.2, Page 48, UST 61, Ground Water Monitoring Results. The section cites Table 3.5-5 for TPH and PAH analysis. However, the relationship between the cited table and UST 61 is not apparent. It appears the incorrect table has been referenced. The correct table should be identified and incorporated in the text.

41. Page 50, §3.5.18; add a reference to the location of this UST on figure 2.

42. Section 3.5.18.2, Page 50, UST 69, Groundwater Monitoring Results. Trace amounts of TPH were documented in a groundwater sample; however, no recommendation is offered concerning the documented groundwater contamination. Further evaluation of the contamination is warranted, specifically as it relates to the source, nature and extent of TPH in groundwater for this area. The text should be modified to include a discussion of additional investigative activities required for this area.

43 Page 50, §3.5.18.2; if no ground water monitoring was performed, how were there results obtained from a monitoring well?

44. Page 52, §3.6; EPA comment on the EBS indicated that a few more investigations need to be performed on the groundwater. This section may need to be expanded to include the additional EBS related information to be collected.

45. Page 62, §4.5.2.1, site Description and History, ¶5; provide the analytical results from the 4 soil borings. Indicate the extent of contamination at this site.

46. Page 63, §4.6.1.1, Description of Work, ¶2; the staining is suspected to have been due to transformer leakage.

47. Page 66, §4.6.1.3 Conclusions and recommendations, ¶2; the Navy should remove the free product on the groundwater as soon as possible to reduce the impacts from the continuing source.

48. Table 3.6-1, Phase II EBS - Ground Water Samples, Main Center; explain the following footnote in the text: "** EBS 88 samples from check wells which were removed after sampling.".

49. Page 73, section 6.1 summary. This evaluation should also be an evaluation on the suitability of existing data. In other sites around the region, firefighting training areas such as Site 11 have been known to contain much more contamination both in the water table and in the bedrock down gradient from the site. In checking through the groundwater elevations down gradient from the site there seems to be an area that has petroleum contamination, but it is unclear if it is from the Site 11 or from one or the other LUSTs in the area. Additionally, the deep wells near the LUST

and EBS items down gradient from Site 11 also showed some CVOC hits that haven't been explained by the sources in the area. A big picture look, using graphics, at theses related(?) sites should be part of this document. Additionally down gradient from Site 6 there also seems to be a lack of information closer to Hall Creek where the CVOCs may have migrated since the source was developed in the early 1970s. A chemists evaluation of the migration potential (fate and transport) of the amount of chemicals disposed of and the amount found in the site groundwater should also be conducted for Sites 6, 11 & 13.

50. Additionally, the incremental ecological risks from storm water/groundwater impacts on the sediments in the watercourses has not been evaluated. Please provide a strategy for resolution of this issue.

51. Section 6.2, Recommendations. The recommendations section appears to be very general. No further action or limited action has been recommended for the groundwater within the four watersheds at the site. Based on the comments above, this recommendation is very broad and does not appear to be appropriate for all sites. It is recommended that a table be included which lists all of the sites, identifying whether groundwater is contaminated, and recommending a course of action for each particular site. As noted in the comments above, it appears that further evaluation is warranted at several sites.

add to Att B

March 97

From: <linda.gardiner@stoneweb.com>
To: R1CANAL.R1WMD(WILLIAMS-CHRISTINE),RTPMAINHUB.INTER...
Date: 3/17/97 3:53pm
Subject: GW Evaluation "Points Paper"

March 20, 1997

cc by fax: Rich Gottlieb - RIDEM
Walter Davis - CSO
Susan Licardi - ToNK

To All,

A BRAC Cleanup Team (BCT) meeting was held at Davisville on Thursday, March 13, 1997 to revise schedules for several tasks including the Ground Water Evaluation. The direction that the Ground Water Evaluation was heading was also discussed. This points paper attempts to detail background information and previous discussions of the BCT in preparation for a meeting scheduled for Thursday, April 3, 1997 at Stone & Webster's Boston office.

A Draft Ground Water Evaluation Report was released by Stone & Webster in October 1996. The report included an evaluation of ground water on a site-by-site basis, and included IR program Sites, Environmental Baseline Survey (EBS) Review Items, and former underground storage tank (UST) areas. Issues raised by EPA and RIDEM in comments on the draft report and in the December 12, 1996 BCT meeting led to significant changes in the evaluation, including preparation of constituent summary figures and tables, and human health and ecological risk assessments.

Several issues were discussed in the March 13, 1997 BCT meeting. I will attempt to summarizes those issues below.

The proposed schedule allows for time to prepare the risk assessments, although the Rhode Island Economic Development Corporation (RIEDC) has responded negatively to the schedule extension, because developers and financial lending institutions are ready to transfer the property. In looking for ways to shorten the schedule, the Navy questioned whether a facility-wide deed restriction (against the installation of a well) would answer regulatory concerns, while shortening the schedule to satisfy RIEDC. Keep in mind that the ground water is already classified as GB by the Rhode Island Department of Environmental Protection (RIDEM), which means that the water is not suitable for use without prior treatment. In addition, RIEDC plans to restrict well installation and supply water (to be piped in) as needed to property occupants. If placement of a basewide deed restriction would solve the problem, then the risk assessments may not be necessary. RIEDC is concerned about the blanket application of deed restrictions and the impact on property suitability perception by prospective buyers and financial institutions. RIEDC favors deed restrictions only where they are required. Additionally, RIDEM, is concerned about whether ecosystems will be sufficiently protected with a deed restriction, since we cannot prohibit animal use of the streams and creeks.

Questions about the risk assessments included, "What is the actual objective of the risk assessments and where are they going to take us?" If risks are found, how will the evaluation and recommendations be affected? It was the general consensus, after discussion and review of the preliminary constituent

summary figures which detail the exceedances of MCLs, SMCLs, or background levels, that the ground water will not require treatment. The source areas have been removed or will be removed in most cases. The idea of returning to the site-by-site evaluation was raised, because the constituent summary figures and tables may be enough to reach a conclusion with respect to each site. This is especially true since most of the source areas have been removed. However, the TRC risk assessment was performed incorrectly and some documentation is required for the Administrative Record to reflect this.

Another problem may arise with respect to the risk assessments: the sample analytical programs are different between the various types of sites or investigations (UST, EBS, IR Program). For example, the UST samples may have been analyzed for TPH and BTEX, but the surface water/sediment risk in the watershed may be due to PAH.

One proposal on the table to be reviewed would discontinue the Ground Water Operable Unit (GWOU) as a separate entity requiring a PRAP and ROD and convert the RODs for Sites 6, 11, 13 to whole site RODs. Sites 5, 12, and 14 (previously issued RODs) addressed soils only and are not impacted. Site 8 (West Davisville DPDO Chemical Disposal Area) would be added to 6 and 11 to address ground water. Study Area 15 would be a whole site issue. This would also mean that land not currently associated with a CERCLA IR site would not be constrained by ground water. The April 3 meeting will review this proposal to ensure that ERA issues are adequately addressed.

Please respond to me regarding attendance at the meeting on April 3, 1997. Please indicate whether or not you will need a parking space. Also indicate whether or not you need directions, and if so, where you will be coming from. Stone & Webster is next door to South Station on Summer Street, Boston. It is accessible by car, commuter rail train (there is a line from Providence to South Station), the "T", or bus. For those of you coming by plane to Logan Airport, your options include the "T", the water shuttle, or a cab. I will be sending out directions on how to get here via various modes of transportation at a later date.

If I have left someone out who should be attending the meeting, please feel free to notify me or forward this message to them. Please pass this message along within your organizations as appropriate and notify me with the names of those individuals who will be attending on April 3.

If you have any questions or comments, please feel free to contact me by phone at (617) 589-1695, fax (617) 589-2922, or e-mail at linda.gardiner@stoneweb.com.

Linda

From: Final HHRA: Sites 06 and 11 Groundwater May 1998

N62578.AR.001192

(7) If an RBC was not available for a specific chemical in ground water, the chemical was retained for further evaluation as a COC, except as discussed in Section 1.3.1.3.1 and 1.3.1.4.1

(8) All omitted chemicals and exposure routes were reconsidered for inclusion based on special considerations (see Section 1.3.1.3.1 and 1.3.1.4.1)

1.3.1.3.1 Additional Considerations in COC Screening

The preliminary list of ground water COC selected on the basis of risk-based screening (EPA 1993a, 1997b) was further evaluated, using additional considerations:

(1) If an RBC was not available for a specific chemical in a particular medium, the RBC for a structurally similar compound was used, if warranted:

a. The RBC for endrin was applied to endrin ketone.

b. The RBC for naphthalene was used to screen for 2-methyl naphthalene.

c. Because chromium III and chromium VI were not analyzed for separately, as a conservatively prudent measure, the RBC for the more toxic constituent, chromium VI, was used.

d. The action level of 15 μg/L lead were used for lead screening in ground water.

(2) For inorganic constituents in ground water, statistical comparisons between naturally-occurring background concentrations and on-site concentrations were made using the method of evaluation of exceedences. Detected concentrations of each chemical were compared with ground water background levels (Table 1-1) developed by Stone & Webster (1996) for each specific constituent in ground water to determine whether or not the number of exceedences above the background levels were statistically significant. Because the background levels developed by Stone & Webster represent extreme upper limits on typical background concentrations, geometric means of sample and background data sets could not be compared to investigate if the site concentrations were related to background levels. Therefore, the method of choice for background comparison was the method of evaluation of number of exceedences using the binomial distribution. The more exceedences observed, the higher the

-1-

significance or smaller the p-value (i.e., the probability of finding the observed number of exceedence, or more, due to chance alone). This nonparametric approach is a scientifically sound approach to evaluate the number of occurrences of concentrations falling above some hypothetical limit that represent a background situation.

If the p-value was greater than 0.1 number of exceedences was deemed to be not significant and the chemical was excluded from the risk assessment.

(3) A chemical was eliminated from the list of COCs if it was an essential nutrient of low toxicity, and if its reported maximum concentration was unlikely to be associated with adverse health impacts. COCs excluded from further consideration on this basis included calcium, magnesium, iron, potassium, and sodium.

1.3.1.3.2 Site-Specific COC in Ground Water

Summary data for detected analytes in ground water, relevant tap water RBCs, and the screening steps used to select COCs, are presented in Tables 1-2 and 1-3, for Sites 06 and 11, respectively. Chemicals for which the maximum concentration did not exceed the medium-specific RBC were marked "No" in the RBC screening tables and were eliminated from further consideration. Tables 1-2 and 1-3 also detail the additional screening steps applied to screen the list of potential COCs for inclusion on the list of final COCs.

Site 06 Ground Water - Lead was retained as a COC at the conclusion of COC screening process.

Site 11 Ground Water - Bis(2-ethylhexyl)phthalate was retained as a Site 11 COC in ground water.

The final lists of ground water COCs at Sites 06 and 11 are summarized in Tables 1-4 and 1-5.

Summary statistics (e.g., frequency of detection, range of detection, mean, and the upper 95th percentile confidence limit on the mean) for all COCs in ground water at Sites 06 and 11 are presented in Tables 1-6 and 1-7, respectively.

Table 1-1 Summary of Background Data for Inorganics in Ground Water (Stone & Webster 1996)

Inorganic Chemical	Background Concentration (µg/L)
Aluminum	5315
Antimony	6
Arsenic	6.4
Barium	80.5
Beryllium	1.3
Cadmium	3
Calcium	13302
Chromium	214
Cobalt	24.9
Copper	25.8
Cyanide	-
Iron	25500
Lead	4.8
Magnesium	5126
Manganese	3292
Mercury	-
Nickel	-
Potassium	3843
Selenium	-
Silver	1
Sodium	12346
Thallium	-
Vanadium	24.4
Zinc	89.9

TABLE 1-2 Selection of Chemicals of Concern from List of Detected Analytes in Groundwater-- Site 06, Davisville

Chemical [1]	Max Detected Concentration (ug/L) [2,*]	Risk-Based Concentration (ug/L) [3]	RIDEM Method I (ug/L)	Max > RBC?	Frequency of Detection	Frequency of Detection [4]	Frequency of Detection > 5%?	Statistically Elevated Above Background? [5]	Essential Nutrient? [6]	COC? [7]
Inorganics (ug/L)										
Aluminum	215	3,700		No	2/6	33%	Yes	No	No	No
Arsenic	0.9	0.045		Yes	1/6	17%	Yes	No	No	No
Barium	24.4	260	2000	No	6/6	100%	Yes	No	No	No
Calcium	20600			-	6/6	100%	Yes	Yes	Yes	No
Cobalt	7.1	220		No	1/6	17%	Yes	No	No	No
Copper	4.1	150		No	1/6	17%	Yes	No	No	No
Iron	32900	1,100		Yes	6/6	100%	Yes	No	Yes	No
Lead	17.8	15	15	Yes	3/6	50%	Yes	Yes	No	Yes
Magnesium	5590			-	6/6	100%	Yes	No	Yes	No
Manganese	1300	84		Yes	6/6	100%	Yes	No	No	No
Potassium	8230			-	6/6	100%	Yes	Yes	Yes	No
Selenium	1.5	18	50	No	1/6	17%	Yes	No	No	No
Sodium	106000			-	6/6	100%	Yes	Yes	Yes	No

Notes:
1- Table presents only those constituents identified above laboratory detection limits
2- Maximum detected concentration of low-flow samples collected by TRC in 1993
3- RBC screening was conducted by comparing maximum detected concentration of a chemical to its USEPA Region III RBC. If the max. concentration of a carcinogen exceeded its RBC in tap water, or if the max. concentration of a noncarcinogen exceeded one-tenth its RBC in tapwater, the chemical was included for further consideration.
4- The chemicals with frequency of detection (ie, detection above laboratory detection limit) greater than or equal to 5 % were retained for further consideration.
5- A statistical analysis was performed to determine whether or not the differences between site inorganic concentrations and the background inorganic concentrations proposed by Stone &

Webster (1996) were statistically significant. The statistical method used was the method of evaluation of exceedance, based on the number of exceedances above the background levels, per discussion with EPA Region I. The chemicals with concentrations statistically elevated above the background levels were retained for further consideration.
6- A chemical was eliminated from the list of COC if it was an essential nutrient of low toxicity.
7-Constituent of Concern
*Maximum concentration of each chemical was also compared to RIDEM Method I Groundwater Quality Standard (mg/l), if available. The RBC concentrations were more stringent than the Method I values in all cases.

Sources: Background Value - Final Basewide Ground Water Inorganics Study Report, Stone & Webster, 06 September 1996, as revised 15 November 1996
EPA Region III RBC - Risk-Based Concentration Table, January-June 1996, US EPA Region III, April 1996
Draft Final Phase II Remedial Investigation, TRC 1994
Draft Environmental Baseline Survey - EA Engineering 1996
Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December 1989.
RIDEM. Remediation Regulations. DEM-DSR-01-93.Table 3-Groundwater Objectives. pg. 48. August. 1996.
Personal Communication with Jayne Michaud, USEPA Region I. April 15. 1997.

TABLE 1-3 Selection of Chemicals of Concern from List of Detected Analytes in Groundwater-- Site 11, Davisville

Chemical [1]	Max Detected Concentration (ug/L) [2,*]	Risk-Based Concentration (ug/L) [3]	RIDEM Method 1 (ug/L)	Max > RBC?	Frequency of Detection	Frequency of Detection [4]	Frequency of Detection > 5%?	Statistically Elevated Above Background? [5]	Essential Nutrient? [6]	COC? [7]
Inorganics (ug/L)										
Aluminum	4760	3700		Yes	10/13	76.92%	Yes	No	No	No
Antimony [**]	44.8	1.5	6	Yes	1/14	7.14%	Yes	Yes	No	Yes [**]
Arsenic	6.2	0.045		Yes	2/13	15.38%	Yes	No	No	No
Barium	71.7	260	2000	No	13/13	100.00%	Yes	No	No	No
Cadmium	0.44	1.8	5	No	1/13	7.69%	Yes	No	No	No
Calcium	29300			-	13/13	100.00%	Yes	Yes	Yes	No
Chromium	9.9	18	100	No	2/13	15.38%	Yes	No	No	No
Cobalt	13.6	220		No	1/13	7.69%	Yes	No	No	No
Copper	11.5	150		No	4/13	30.77%	Yes	No	No	No
Iron	55800	1100		Yes	13/13	100.00%	Yes	Yes	Yes	No
Lead	2.2	15	15	No	1/13	7.69%	Yes	No	No	No
Magnesium	8240			-	13/13	100.00%	Yes	No	Yes	No
Manganese	2710	84		Yes	13/13	100.00%	Yes	No	No	No
Potassium	9320			-	8/13	61.54%	Yes	Yes	Yes	No
Silver	1	18		No	10/13	76.92%	Yes	No	No	No
Sodium	33100			-	13/13	100.00%	Yes	No	Yes	No

Chemical [1]	Max Detected Concentration (ug/L) [2,*]	Risk-Based Concentration (ug/L) [3]	RIDEM Method 1 (ug/L)	Max > RBC?	Frequency of Detection	Frequency of Detection [4]	Frequency of Detection > 5%?	Statistically Elevated Above Background? [5]	Essential Nutrient? [6]	COC? [7]
Vanadium	7.6	26		No	1/13	7.69%	Yes	No	No	No
Volatiles (ug/L)										
1,1,1-Trichloroethane	2	79	200	No	2/13	15.38%	Yes	NA	NA	No
Acetone	16	370		No	1/13	7.69%	No	NA	NA	No
Semivolatiles (ug/L)										
Bis(2-ethylhexyl) phthalate	14	4.8		Yes	1/12	8.33%	Yes	NA	NA	Yes
Diethyl phthalate	2	2900	6	No	2/13	15.38%	Yes	NA	NA	No
Phenol	1	2200		No	1/13	7.69%	Yes	NA	NA	No
Pesticides/PCB (ug/L)										
Aldrin	0.0015	0.004		No	1/13	7.69%	Yes	NA	NA	No
Alpha-HCH	0.0011	0.011		No	1/13	7.69%	Yes	NA	NA	No
Gamma-HCH (Lindane)	0.0017	0.052		No	1/13	7.69%	Yes	NA	NA	No

Notes:
1- Table presents only those constituents identified above laboratory detection limits
2- Maximum detected concentration of low-flow samples collected by TRC in 1993
3- RBC screening was conducted by comparing maximum detected concentration of a chemical to its USEPA Region III RBC. If the max. concentration of a carcinogen exceeded its RBC in tap water, or if the max. concentration of a noncarcinogen exceeded one-tenth its RBC in tapwater, the chemical was included for further consideration.
4- The chemicals with frequency of detection (ie, detection above laboratory detection limit) greater than or equal to 5 % were retained for further consideration.
5- A statistical analysis was performed to determine whether the difference between site concentrations and the background concentrations proposed by Stone & Webster (1996) were statistically significant or not. The statistical method used was the method of evaluation of exceedance, based on the number of exceedances above the background levels, per discussion with EPA Region I. The chemicals with concentrations statistically elevated above the background levels were retained for further consideration.
6- A chemical was eliminated from the list of COC if it was an essential nutrient of low toxicity.
7-Constituent of Concern
NA- Not Applicable

*Maximum concentration of each chemical was also compared to RIDEM Method I Groundwater Quality Standard (mg/l), if available. The RBC concentrations were more stringent than the Method I values in all cases.

**Antimony was resampled at location MW6D in January 1998, to confirm the detect concentration of 44.8 μg/l observed during the Phase II investigation. In all of the 1998 samples collected (i.e., sample and duplicate sample), antimony was not detected at the detection limit of 1.5 μg/l, which is the risk-based screening concentration for antimony. Therefore, in the remainder of this risk assessment, antimony is not considered to be a COC in Site 11 groundwater, and is not carried through the HHRA because resampling of Site 11 groundwater did not confirm the presence of antimony. A risk management decision was made, in colloboration with EPA Region I, not to include antimony as a COC in this HHRA.

*** Toluene and trichloroethene were listed as detected chemicals in Site 11 ground water in June, 1997 version of this document. The source of these chemicals was EBS88 data. Because the analysis presented in this document does not use EBS88 data per consultation with EPA Region I, these chemicals are not listed in the table given above.

Sources: Background Value - Final Basewide Ground Water Inorganics Study Report, Stone & Webster, 06 September 1996, as revised 15 November 1996
EPA Region III RBC - Risk-Based Concentration Table, January-June 1996, US EPA Region III, April 1996
Draft Final Phase II Remedial Investigation, TRC 1994
Draft Environmental Baseline Survey - EA Engineering 1996
Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December 1989.
RIDEM. Remediation Regulations. DEM-DSR-01-93.Table 3-Groundwater Objectives. pg. 48. August. 1996.
Personal Communication with Jayne Michaud, USEPA Region I. April 15. 1997.

(6) If a chemical was reported to be present in at least one sample in ground water, it was retained for further consideration for all routes of exposure involving the medium unless its frequency of detection was less than 5% (EPA 1989a). If the chemical was retained, all reported nondetects for the chemical were considered to be present at one-half the SQL.

(7) If an RBC was not available for a specific chemical in ground water, the chemical was retained for further evaluation as a COC, except as discussed in Section 1.3.1.3.1 and 1.3.1.4.1

(8) All omitted chemicals and exposure routes were reconsidered for inclusion based on special considerations (see Section 1.3.1.3.1 and 1.3.1.4.1)

1.3.1.3.1 Additional Considerations in Screening for Ground Water COC

The preliminary list of ground water COC selected on the basis of risk-based screening (EPA 1993b, 1997b) was further evaluated, using additional considerations:

(1) If an RBC was not available for a specific chemical in a particular medium, the RBC for a structurally similar compound was used, if warranted:

a. The RBC for endrin was applied to endrin ketone.

b. The RBC for naphthalene was used to screen for 2-methyl naphthalene.

c. Because chromium III and chromium VI were not analyzed for separately, as a conservatively prudent measure, the RBC for the more toxic constituent, chromium VI, was used.

d. The action level of 15 μg/L lead were used for lead screening in ground water.

(2) For inorganic constituents in ground water, statistical comparisons between naturally-occurring background concentrations and on-site concentrations were made using the method of evaluation of exceedences. Detected concentrations of each chemical were compared with ground water background levels (Table 1-2) developed by Stone & Webster (1996) for each specific constituent in ground water to determine whether or not the number of exceedences above the background levels were statistically significant. Because the background levels developed by Stone & Webster represent extreme upper limits on typical background concentrations, geometric means of sample and background data sets could not be compared to investigate if the site concentrations were related to background levels. Therefore, the method of choice for background comparison was the method of evaluation of number of exceedences using the

binomial distribution. The more exceedences observed, the higher the significance or smaller the p-value (i.e., the probability of finding the observed number of exceedence, or more, due to chance alone). This nonparametric approach is a scientifically sound approach to evaluate the number of occurrences of concentrations falling above some hypothetical limit that represent a background situation.

If the p-value was greater than 0.1 number of exceedences was deemed to be not significant and the chemical was excluded from the risk assessment.

(3) A chemical was eliminated from the list of COCs if it was an essential nutrient of low toxicity, and if its reported maximum concentration was unlikely to be associated with adverse health impacts. COCs excluded from further consideration on this basis included calcium, magnesium, iron, potassium, and sodium.

1.3.1.3.2 Site-Specific COC in Ground Water

Summary data for detected analytes in ground water, relevant tap water RBCs, and the screening steps used to select COCs, are presented in Table 1-3. Chemicals for which the maximum concentration did not exceed the medium-specific RBC were marked "No" in the RBC screening tables and were eliminated from further consideration. Table 1-3 also details the additional screening steps applied to screen the list of potential COCs for inclusion on the list of final COCs.

Site 13 Ground Water—Beryllium, 1,2-dichloroethane, pentachlorophenol, and heptachlor epoxide were identified as Site 13 COCs in ground water.

The final lists of ground water COCs at Site 13 are summarized in Table 1-9.

Summary statistics (e.g., frequency of detection, range of detection, mean, and the upper 95th percentile confidence limit on the mean) for all COCs in ground water at Site 13 are presented in Tables 1-4.

1.3.1.4 Risk-Based Concentration Screening For Soil at Site 13

The risk-based screening process utilized for Site 13 soil followed that developed by EPA Region III. The purpose of the risk-based screen was to identify for inclusion in the HHRA only those chemicals that would likely impact the overall estimation of potential health risks. The risk-based concentration screen was used as described in the following steps (EPA 1993b):

(1) The maximum concentration of each potential COC detected in each medium was identified.

Table 1-2 Summary of Background Data for Inorganics in Ground Water (Stone & Webster 1996)

Inorganic Chemical	Background Concentration (µg/L)
Aluminum	5315
Antimony	6
Arsenic	6.4
Barium	80.5
Beryllium	1.3
Cadmium	3
Calcium	13302
Chromium	214
Cobalt	24.9
Copper	25.8
Cyanide	-
Iron	25500
Lead	4.8
Magnesium	5126
Manganese	3292
Mercury	-
Nickel	-
Potassium	3843
Selenium	-
Silver	1
Sodium	12346
Thallium	-
Vanadium	24.4
Zinc	89.9

TABLE 1-3. Selection of Chemicals of Concern from List of Detected Analytes in Groundwater-- Site 13, Davisville

Chemical [1]	Max Detected Concentration [2,*] (ug/L)	Risk-Based Concentration [3] (ug/L)	RIDEM Method 1 (ug/L)	Max > RBC?	Frequency of Detection	Frequency of Detection [4]	Frequency of Detection > 5%?	Statistically Elevated Above Background? [5]	Essential Nutrient? [6]	Additional Considerations? [7]	COC? [8]
Inorganics (ug/L)											
Aluminum	6450	3700		Yes	16/19	84.21 %	Yes	No	No		No
Antimony [**]	36.4	1.5	6	Yes	1/16	6.25%	Yes	Yes	No		Yes [**]
Arsenic	5.4	0.045		Yes	2/18	11.1 %	Yes	No	No		No
Barium	91.35	260	2000	No	16/19	84.21 %	Yes	No	No		No
Beryllium	2.6	0.016	4	Yes	4/19	21.05%	Yes	Yes	No		Yes
Cadmium	1.1	1.8	5	No	4/17	23.53%	Yes	No	No		No
Calcium	13400			-	16/19	84.21 %	Yes	No	Yes		No
Chromium	10.2	18	100	No	8/19	15.79%	Yes	No	No		No
Cobalt	27	220		No	5/19	26.32%	Yes	No	No		No
Copper	15.9	150		No	5/19	26.32%	Yes	No	No		No
Iron	34100	1100		Yes	16/19	84.21 %	Yes	No	Yes		No
Lead	4.4	15	15	No	3/19	18.79%	Yes	No	No		No
Magnesium	4270			-	16/19	84.21%	Yes	No	Yes		No
Manganese	3810	84		Yes	16/19	84.21 %	Yes	No	No		No
Potassium	6280			-	16/19	84.21%	Yes	Yes	Yes		No

Chemical [1]	Max Detected Concentration [2,*] (ug/L)	Risk-Based Concentration [3] (ug/L)	RIDEM Method 1 (ug/L)	Max > RBC?	Frequency of Detection	Frequency of Detection [4]	Frequency of Detection > 5%?	Statistically Elevated Above Background? [5]	Essential Nutrient? [6]	Additional Considerations? [7]	COC? [8]
Silver	0.64	18		No	8/19	42.11%	Yes	No	No		No
Sodium	50900			-	16/19	84.21%	Yes	Yes	Yes		No
Vanadium	22	26		No	6/19	31.58%	Yes	No	No		No
Zinc	60	1100		No	6/19	37.50%	Yes	No	No		No
Volatiles (ug/L)											
1,2-Dichloroethane	1	0.12	5	Yes	1/16	6.25%	Yes	NA	NA		Yes
2-Butanone	6	1900		No	1/16	6.25%	Yes	NA	NA		No
Trichloroethene	1	1.6	5	No	1/16	6.25%	Yes	NA	NA		No
Xylenes (Total)	1	1200	10000	No	1/16	6.25%	Yes	NA	NA		No
Semivolatiles (ug/L)											
2-Methylnaphthalene 7	4	150		No	3/16	18.75%	Yes	NA	NA	RIDEM Method I value: 20 ug/l	No
Di-n-butyl phthalate	2	370		No	6/16	37.50%	Yes	NA	NA		No
Diethyl phthalate	1	2900		No	1/16	6.25%	Yes	NA	NA		No
Naphthalene	3	150	20	No	4/16	25.00%	Yes	NA	NA	RIDEM Method I value: 20 ug/l	No
Pentachlorophenol	2	0.56	1	Yes	1/16	6.25%	Yes	NA	NA		Yes
Phenol	3	2200		No	2/16	12.50%	Yes	NA	NA		No

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Chemical [1]	Max Detected Concentration [2,**] (ug/L)	Risk-Based Concentration [3] (ug/L)	RIDEM Method I (ug/L)	Max > RBC?	Frequency of Detection	Frequency of Detection [4]	Frequency of Detection > 5%?	Statistically Elevated Above Background? [5]	Essential Nutrient? [6]	Additional Considerations? [7]	COC? [8]
Pesticides/PCB (ug/L)											
4,4'-DDD	0.021	0.28		No	6/16	37.50%	Yes	NA	NA		No
Alpha-HCH	0.00425	0.011		No	1/16	6.25%	Yes	NA	NA		No
Dieldrin	0.0017	0.0042		No	1/16	6.25%	Yes	NA	NA		No
Endrin ketone 8	0.0077	1.1		No	3/16	18.75%	Yes	NA	NA		No
Heptachlor epoxide	0.028	0.0012		Yes	4/16	25.00%	Yes	NA	NA		Yes

Notes: 1- Table presents only those constituents identified above laboratory detection limits
2- Maximum detected concentration of low-flow samples collected by TRC in 1993
3- RBC screening was conducted by comparing maximum detected concentration of a chemical to its USEPA Region III RBC. If the max. concentration of a carcinogen exceeded its RBC in tap water, or if the max. concentration of a noncarcinogen exceeded one-tenth its RBC in tapwater, the chemical was included for further consideration.
4- The chemicals with frequency of detection (ie, detection above laboratory detection limit) greater than or equal to 5 % were retained for further consideration.
5- A statistical analysis was performed to determine whether the difference between site concentrations and the background concentrations proposed by Stone & Webster (1996) were statistically significant or not. The statistical method used was the method of evaluation of exceedance, based on the number of exceedances above the background levels, per discussion with EPA Region I. The chemicals with concentrations statistically elevated above the background levels were retained for further consideration.
6- A chemical was eliminated from the list of COC if it was an essential nutrient of low toxicity.
7- Maximum detected concentration of each chemical was also compared to RIDEM Method I Groundwater Quality Standard, if available. Napthalane was the only chemical with a Method I value more stringent than the EPA Region III RBC value.
8-Constituent of Concern
NA- Not Applicable
**Antimony was resampled at location MW10S in January 1998, to confirm the detect concentration of 36.4 μg/l observed during the Phase II investigation. In all of the 1998 samples collected (i.e., sample and duplicate sample), antimony was not detected at the detection limit of 1.5 μg/l, which is the risk-based screening concentration for antimony. Therefore, in the remainder of this risk assessment, antimony is not considered to be a COPC in Site 13 groundwater, and is not carried through the HHRA, because resampling of Site 13 groundwater did not confirm the presence of antimony. A risk management decision was made, in colloboration with EPA Region I, not to include antimony as a COPC in this HHRA.

Sources: Background Value - Final Basewide Ground Water Inorganics Study Report, Stone & Webster, 06 September 1996, as revised 15 November 1996
EPA Region III RBC - Risk-Based Concentration Table, January-June 1996, US EPA Region III, April 1996
Draft Final Phase II Remedial Investigation, TRC 1994
Draft Environmental Baseline Survey - EA Engineering 1996
Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December 1989.
RIDEM. Remediation Regulations. DEM-DSR-01-93.Table 3-Groundwater Objectives. pg. 48. August. 1996.
Personal Communication with Jayne Michaud, USEPA Region I. April 15. 1997.

Method I Ground Water Quality Standard (RIDEM 1996), if the Method I value was more stringent than the RBC value.

(5) In ground water, if no carcinogenic chemicals were present at concentrations exceeding either their RBCs for carcinogenic effects and no chemicals exhibiting adverse effects other than cancer were present at concentrations exceeding one-tenth their RBCs for noncancer effects, then the medium was excluded from the risk assessment.

(6) If a chemical was reported to be present in at least one sample in ground water, it was retained for further consideration for all routes of exposure involving the medium unless its frequency of detection was less than 5% (EPA 1989a). If the chemical was retained, all reported nondetects for the chemical were considered to be present at one-half the SQL.

(7) If an RBC was not available for a specific chemical in ground water, the chemical was retained for further evaluation as a COC, except as discussed in Section 1.3.1.3.1.

(8) All omitted chemicals and exposure routes were reconsidered for inclusion based on special considerations (see Section 1.3.1.3.1)

1.3.1.3.1 Additional Considerations in Screening for Ground Water COC

The preliminary list of ground water COC selected on the basis of risk-based screening (EPA 1993a, 1997b) was further evaluated, using additional considerations:

(1) If an RBC was not available for a specific chemical in a particular medium, the RBC for a structurally similar compound was used, if warranted:

a. Because chromium III and chromium VI were not analyzed for separately, as a conservatively prudent measure, the RBC for the more toxic constituent, chromium VI, was used.

b. The action level of 15 μg/L lead were used for lead screening in ground water.

(2) For inorganic constituents in ground water, statistical comparisons between naturally-occurring background concentrations and on-site concentrations were

made using the method of evaluation of exceedences. Detected concentrations of each chemical were compared with ground water background levels (Table 1-1) developed by Stone & Webster (1996) for each specific constituent in ground water to determine whether or not the number of exceedences above the background levels were statistically significant. Because the background levels developed by Stone & Webster represent extreme upper limits on typical background concentrations, geometric means of sample and background data sets could not be compared to investigate if the site concentrations were related to background levels. Therefore, the method of choice for background comparison was the method of evaluation of number of exceedences using the binomial distribution. The more exceedences observed, the higher the significance or smaller the p-value (i.e., the probability of finding the observed number of exceedence, or more, due to chance alone). This nonparametric approach is a scientifically sound approach to evaluate the number of occurrences of concentrations falling above some hypothetical limit that represent a background situation.

If the p-value was greater than 0.1 number of exceedences was deemed to be not significant and the chemical was excluded from the risk assessment.

(3) A chemical was eliminated from the list of COCs if it was an essential nutrient of low toxicity, and if its reported maximum concentration was unlikely to be associated with adverse health impacts. COCs excluded from further consideration on this basis included calcium, magnesium, iron, potassium, and sodium.

1.3.1.3.2 Site-Specific COC in Ground Water

Summary data for detected analytes in Site 08 ground water, relevant tap water RBCs, and the screening steps used to select COCs, are presented in Table 1-2. Chemicals for which the maximum concentration did not exceed the medium-specific RBC were marked "No" in the RBC screening tables and were eliminated from further consideration. Tables 1-2 also details the additional screening steps applied to screen the list of potential COCs for inclusion on the list of final COCs.

A close examination of analysis presented in Table 1-2 shows that no COCs are identified in Site 08 ground water. It should be noted that the maximum detected concentrations of arsenic, beryllium, and manganese at Site 08 exceeds the risk-based screening criteria. However, when background data is available it is prudent that a statistical comparison

between site concentrations and background concentrations be performed to identify the non-site related chemicals that are found at or near the site (EPA 1989a, pg 5-18, Section 5.7, first paragraph). This exercise is part of data evaluation in a human health risk assessment. EA consulted with the EPA Region I on behalf of the Navy and received written approval of the statistical procedure described in Section 1.3.1.3.1 for comparison of site samples with background (e-mail from Jayne Michaud of EPA Region I dated April 17, 1997). The statistical evaluation showed that none of these three chemicals are associated with potential onsite contamination, thus excluded from further analyses as chemicals of potential concern at Site 8 ground water. The analysis in this HHRA and the rational presented above eliminates the need to perform a quantitative evaluation of exposures and risks to potential human receptors at Site 08.

1.3.1.4 Uncertainty in Application of a Risk-Based Screening Level Approach

As stated in *Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening – Technical Guidance Manual* (EPA 1993b), the EPA Region III RBCs are likely to be protective as no-action levels for human health for sites where: (1) a single medium is contaminated; (2) a single contaminant contributes nearly all of the health risk; (3) volatilization or leaching of that contaminant from soil is expected not to be significant; and (4) the exposure scenarios used in developing the values in the RBC table are appropriate for the site. In addition, site-specific conditions that would affect the tendency of chemicals to volatilize or leach from soil introduces additional uncertainty in the use of SSLs.

For Site 08, no chemical of concern is the predominant contributor to potential risk. These factors help minimize uncertainty in ground water risk screening outcomes.

1.4 SUMMARY AND CONCLUSIONS

The objective of this human health risk assessment was to evaluate the potential for adverse health effects to populations exposed to chemicals of concern in ground water at Site 08. Exposed populations included future construction workers, and future resident adults and children.

Risk-based screening performed for Site 08 groundwater, as described in detail in Section 1.3.1.3, resulted in no COCs exceeding their respective risk-based screening concentrations. RBCs are chemical concentrations that correspond to fixed levels of risk (i.e., either a one-in-one-million cancer risk or a noncarcinogenic hazard quotient of one,

Table 1-1 Summary of Background Data for Inorganics in Ground Water (Stone & Webster 1996)

Inorganic Chemical	Background Concentration (µg/L units)
Aluminum	5315
Antimony	6
Arsenic	6.4
Barium	80.5
Beryllium	1.3
Cadmium	3
Calcium	13302
Chromium	214
Cobalt	24.9
Copper	25.8
Cyanide	-
Iron	25500
Lead	4.8
Magnesium	5126
Manganese	3292
Mercury	-
Nickel	-
Potassium	3843
Selenium	-
Silver	1
Sodium	12346
Thallium	-
Vanadium	24.4
Zinc	89.9

TABLE 1-2 Selection of Chemicals of Concern from List of Detected Analytes in Groundwater-- Site 08, Davisville

Chemical [1]	Max Detected Concentration [2,*]	Risk-Based Concentration [3]	RIDEM Method 1	Max > RBC?	Frequency of Detection	Frequency of Detection [4]	Frequency of Detection > 5%?	Statistically Elevated Above Background? [5]	Essential Nutrient? [6]	COC? [7]
Inorganics										
Aluminum	3380	3700		No	4/4	100.00%	Yes	No	No	No
Arsenic	1.8	0.045		Yes	3/4	75.00%	Yes	No	No	No
Barium	41.9	260	2000	No	4/4	100.00%	Yes	No	No	No
Beryllium	1	0.016	4	Yes	1/4	25.00%	Yes	No	No	No
Chromium	7.1	18	100	No	3/4	75.00%	Yes	No	No	No
Cobalt	4.7	220		No	2/4	50.00%	Yes	No	No	No
Copper	7.9	150		No	3/4	75.00%	Yes	No	No	No
Cyanide	3.1	73	200	No	1/4	25.00%	Yes	NA	No	No
Lead	3.3	15	15	No	3/4	75.00%	Yes	No	No	No
Manganese	1300	84		Yes	4/4	100.00%	Yes	No	No	No
Vanadium	4.6	26		No	1/4	25.00%	Yes	No	No	No
Volatiles										
Acetone	92	370		No	2/4	50.00%	Yes	NA	NA	No

EA Engineering, Science, and Technology, Inc.

Notes:
1- Table presents only those constituents identified above laboratory detection limits
2- Maximum detected concentration of low-flow samples collected by TRC in 1993
3- RBC screening was conducted by comparing maximum detected concentration of a chemical to its USEPA Region III RBC. If the max. concentration of a carcinogen exceeded its RBC in tap water, or if the max. concentration of a noncarcinogen exceeded one-tenth its RBC in tapwater, the chemical was included for further consideration.
4- The chemicals with frequency of detection (ie, detection above laboratory detection limit) greater than or equal to 5 % were retained for further consideration.
5- A statistical analysis was performed to determine whether the difference between site concentrations and the background concentrations proposed by Stone & Webster (1996) were statistically significant or not. The statistical method used was the method of evaluation of exceedance, based on the number of exceedances above the background levels, per discussion with EPA Region I. The chemicals with concentrations statistically elevated above the background levels were retained for further consideration.
6- A chemical was eliminated from the list of COC if it was an essential nutrient of low toxicity.
7-Constituent of Concern
NA- Not Available
*Maximum concentration of each chemical was also compared to RIDEM Method I Groundwater Quality Standard (mg/l), if available. The RBC concentrations were more stringent than the Method I values in all cases.

Sources:
Background Value - Final Basewide Ground Water Inorganics Study Report, Stone & Webster, 06 September 1996, as revised 15 November 1996
EPA Region III RBC - Risk-Based Concentration Table, January-June 1996, US EPA Region III, April 1996
Draft Final Phase II Remedial Investigation, TRC 1994
Draft Environmental Baseline Survey - EA Engineering 1996
Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December 1989.
RIDEM. Remediation Regulations. DEM-DSR-01-93.Table 3-Groundwater Objectives. pg. 48. August. 1996.
Personal Communication with Jayne Michaud, USEPA Region I. April 15. 1997.

June '98

FINAL

RECORD OF DECISION

SOILS AND GROUND WATER OPERABLE UNITS
SITE 10 - CAMP FOGARTY DISPOSAL AREA
AND
GROUND WATER OPERABLE UNIT
SITE 08 - DPDO FILM PROCESSING DISPOSAL AREA

FORMER NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RHODE ISLAND

E. SITE CHARACTERISTICS

For NCBC Davisville, an IAS was completed in September 1984, detailing the historical hazardous material usage and waste disposal practices at the facility. Included in the various areas identified in this study were Sites 08 and 10. The IAS was followed by the CS, which included environmental sampling and analysis to verify the presence of constituents at the sites. Specific details of site history and the investigations conducted are provided in the following sections.

Site 10: Site 10 is characterized by the presence of three depressions located between the firing range berms and a steeply rising hill. The vicinity of the site is heavily wooded, interspersed with meadow areas. Runoff is expected to be minimal since the site consists of depression areas and the soils are well-drained. No surface water bodies exist within Camp Fogarty.

Shallow ground water flow converges toward the topographically low, north-central portion of the site. The northernmost depression/disposal area has the lowest elevation and appears to dominate shallow ground water flow. In the southern portion of the site, shallow ground water flow is generally toward the north-northeast, and in the northern portion of the site, shallow ground water flow is generally to the south-southwest.

Camp Fogarty lies within the Potowomut River Basin. Ground water at Site 10 is classified as GAA-NA by RIDEM. Ground water classified as GAA includes those ground water resources which RIDEM has designated to be suitable for public drinking water without treatment. The goal for non-attainment areas is restoration to a quality consistent with the classification.

The DAA (TRC, 1994) contains an overview of the site investigation conducted at Site 10. The notable findings of the site investigations are summarized below.

According to the DAA, Site 10 was identified in the IAS as a possible receptor of hazardous wastes. However, the IAS concluded that the risk posed by Site 10 to human health and the environment was minimal and that no further investigation was necessary. At the request of RIDEM, Site 10 was included in the Verification Step of the CS.

The Verification Step field investigations consisted of two phases which included a site walk-over with an organic vapor analyzer (OVA) and surface soil sampling. One composite surface soil sample was collected from each of four discrete sampling locations and scanned for EPA Priority Pollutants. Another surface soil sample was taken during the second phase of sampling and also scanned for EPA Priority Pollutants.

The Phase I RI, conducted from September 1989 to March 1990, included a limited soil gas survey, the collection of six surface soil samples, two soil borings, and the installation and sampling of three ground water monitoring wells. All soil and ground water samples were submitted for full Target Compound List/Target Analyte List (TCL/TAL) analyses.

The purpose of the Phase II RI at Site 10 was to further delineate the horizontal and vertical location of constituents associated with the disposal activities and to verify the Phase I RI conclusion that there is no significant source at the site. The investigations also provided a basis

for the evaluation of constituent fate and transport mechanisms and data for use in quantitatively evaluating human health risks and ecological risks.

The Phase II RI field investigation activities were conducted at Site 10 from December 1992 to August 1993. They included a soil gas survey, geophysical survey, surface soil sampling, soil boring sampling, and ground water sampling. The geophysical investigation at Site 10 consisted of a seismic refraction survey and an electromagnetic conductivity survey.

The soil gas survey focused on the three large depressions and included the collection of 46 soil gas samples. All of the Phase II soil gas samples were subjected to dual analyses on a portable gas chromatograph (GC). One analysis was conducted according to EPA Method 601 (modified) and the other analysis was conducted according to EPA Method 602 (modified).

Nineteen surface soil samples were collected from 12 surface soil sample locations, five test boring locations (0 to 2 feet), and two monitoring well boring locations (0 to 2 feet). Five subsurface soil samples were taken from one monitoring well boring and four test borings. The surface and subsurface soil samples were analyzed for full TCL and TAL parameters, less pesticides/polychlorinated biphenyls (PCB). Two surface soil samples from Site 10 were also collected for Toxicity Characteristic Leaching Procedure (TCLP) analyses.

After the completion of the monitoring well borings, both shallow wells and deep wells were installed at Site 10. In addition, three bedrock cores were collected during the drilling activities. Ground water samples were collected from each of the eight monitoring wells (five shallow wells and three deep wells). Ground water samples were analyzed in the field for the water quality parameters of pH, specific conductance, temperature, and turbidity, and in the laboratory for full TCL and TAL parameters, less pesticides/PCB. In addition, three ground water samples were analyzed for filtered metals, biochemical oxygen demand (BOD), chemical oxygen demand (COD) and total suspended solids (TSS).

Eighteen background surface soil samples were also collected across NCBC Davisville during the Phase II RI to provide a range of background soil quality for NCBC Davisville soils. All 18 samples were analyzed for full TCL and TAL analytes.

The goal of the ground water investigation at Camp Fogarty was to evaluate the inorganic ground water chemistry, compare the findings to previously reported data and historical aquifer water quality data, and provide recommendations regarding the NPL status of Camp Fogarty with respect to ground water. Water levels and interpreted ground water flow directions were determined from measurements in wells installed during previous investigations in 1991 - 1993. Existing monitoring wells, located in and around the three firing ranges and Site 10, were used to collect water samples for inorganic analyses. Low flow sampling techniques were utilized to collect ground water samples with minimal disturbance.

The results of inorganic analyses were compared to State and Federal water quality standards, such as the Maximum Contaminant Levels (MCL), Secondary Maximum Contaminant Levels (SMCL), Rhode Island State Groundwater Quality Standards, and Risk-Based Concentrations (RBC) developed by the EPA Region III. Results of analyses of ground water samples were also compared to results obtained from samples collected from local public drinking water wells.

The findings of the Phase I RI field activities for Site 10 are discussed in detail in the Phase I RI Technical Report, dated May 1991. The Phase II RI activities conducted at Site 10 are presented in the Phase II RI Technical Report, dated July 1994. A summary of the nature and extent of constituents in soil and ground water based on the RI results are presented by chemical class below. Where appropriate, CS results are also referenced.

Site 08: The site is characterized by a flat grass-covered area with a 10-ft wide paved road passing through the center of it. On the West Davisville NCBC property, ground water appears to flow southwest to northeast toward Sandhill Brook. Site 08 surface water runoff is toward the east and Sandhill Brook. There is possibly a ground water divide oriented in a predominantly north-south direction near Building 317. At this western edge of the area ground water appears to flow westward. This may be a temporary or seasonal condition. Additional rounds of water level measurements would be required to confirm the possible ground water divide. Ground water from the Devil's Foot Road Site also flows toward Sandhill Brook.

West Davisville lies within the Potowomut River Basin. Ground water at Site 08 is classified as GAA-NA by RIDEM. Ground water classified as GAA includes those ground water resources which RIDEM has designated to be suitable for public drinking water without treatment. Areas classified as non-attainment (NA) are those which are known or presumed to be out of compliance with the standards of the assigned classification. The goal for non-attainment areas is restoration to a quality consistent with the classification.

Site 08 was identified in the IAS report as a possible site of hazardous waste disposal. However, the IAS concluded that the risk posed by Site 08 to human health and the environment was minimal and that no further investigation was necessary. At the request of the RIDEM, the site was included in the CS, however no ground water monitoring was performed during this investigation. No ground water monitoring was performed during the Phase I RI.

The purpose of the ground water investigation performed during Phase II RI activities at Site 08 was to assess the shallow ground water quality, including the presence, nature, and extent of constituents in ground water, and to provide information regarding the site hydrogeology. The investigation also provided a basis for the evaluation of contaminant fate and transport mechanisms and data for use in quantitatively evaluating human health risks and ecological risks in ground water.

Three shallow monitoring wells and one deep monitoring well were installed, and ground water was sampled from each well. A shallow well is defined as a well which has the top of the screen above or in close proximity to the water table. A deep well is defined as a well which has the bottom of screen near bedrock. Well sampling was performed using low-flow sampling techniques. Ground water samples were analyzed in the field for the water quality parameters of pH, specific conductance, temperature, and turbidity. Laboratory analysis of the ground water samples included TCL volatile organic compounds (VOC), TCL base, neutral, and acid extractable compounds (BNA), TCL pesticides, PCB, TAL metals, and cyanide. In addition, filtered ground water samples were collected for dissolved metals and cyanide analysis.

The comprehensive evaluation of the ground water at NCBC, including Site 08, was performed. Previous ground water sampling results were compiled and used to assess the condition of the

ground water at Site 08. No new field activities were performed at Site 08 for the Ground Water Evaluation. Site history, results of previous studies, ground water monitoring results, and recommendations for future actions are presented in the Ground Water Evaluation. The inorganic analysis results of ground water samples were compared to water quality standards and the background inorganic values as presented in the *Final Basewide Ground Water Inorganics Study Report - NCBC Davisville, Rhode Island*, prepared by Stone & Webster in September 1996.

F. SUMMARY OF SITE RISKS

Site 10: A Final Technical Memoranda HHRA (EA Engineering, Science, and Technology (EA) November 1996), which addressed Site 10, was prepared based on results obtained from the Phase I and Phase II RI. In addition, a Draft Final Facility-Wide Freshwater/Terrestrial ERA was prepared by EA in February 1996. Subsequently, a Revised Final Technical Memorandum for soils at Site 10 was prepared by EA in January 1998 that addresses various ecological risk issues, and includes specific evaluations of risk from surface soil. These reports are available for review at the Information Repository at the North Kingstown Free Library. The risk assessments were performed to estimate the probability and magnitude of potential adverse human health and environmental effects from exposure to constituents associated with Site 10. The public health risk assessment followed a four step process: 1) constituent identification, which identified those hazardous substances which, given the specifics of the site were of significant concern; 2) exposure assessment, which identified actual or potential exposure pathways, characterized the potentially exposed populations, and determined the extent of possible exposure; 3) toxicity assessment, which considered the types and magnitude of adverse health effects associated with exposure to hazardous substances; and 4) risk characterization, which integrated the three previous steps to summarize the potential and actual risks posed by hazardous substances at the site, including carcinogenic and non-carcinogenic risks. The results of the HHRA for the Site 10 are discussed below, followed by the conclusions of the ERA.

Ten constituents of concern identified for soil at Site 10 were selected for evaluation in the risk assessment. These are listed in Table 1 found in Appendix A of this ROD. These constituents represent a subset of the constituents identified at the Site during the RI. The constituents of concern were selected to represent potential site related hazards based on toxicity, concentration, frequency of detection, and mobility and persistence in the environment. A summary of the health effects of each of the constituents of concern can be found in the HHRA, Section 2.0 (EA, 1996).

Potential human health risks associated with exposure to the constituents of concern were estimated quantitatively or qualitatively through the development of several hypothetical exposure pathways. These pathways were developed to reflect the potential for exposure to hazardous substances based on the present uses, potential future uses, and location of Site 10. Both the Phase I RI and the Phase II RI data were used to characterize the human health risks. Exposure dose was calculated using an upper confidence limit, the 95th percentile of the mean assuming a lognormal distribution (95th UCLM), as well as on the maximum detected chemical concentration (Reasonable Maximum Exposure or RME). Note that this method was used in accordance with the applicable guidance in place when the HHRA was performed. Potential human health exposure scenarios which were evaluated are presented below.

Freshwater/Terrestrial Ecological Risk Assessment (EA, 1996), and in the *Final Technical Memoranda Ecological Risk-Based Surface Soil Remediation Evaluation* (EA, 1997).

- Site 08: Human health risks due to the ground water at Site 08 are presented in the *Final Human Health Risk Assessment (HHRA): Site 08 Ground Water, Naval Construction Battalion Center, Davisville, Rhode Island*, prepared by EA in April 1998.

Risk-based screening performed for Site 08 ground water resulted in no constituents of concern (COCs) exceeding their respective risk-based screening concentrations. RBCs are chemical concentrations that correspond to fixed levels of risk (i.e., either a one-in-one-million cancer risk or a noncarcinogenic hazard quotient of one, whichever occurs at a lower concentration) in tap water. They are derived to be protective of human consumers of tap water.

A close examination of analysis showed that no COCs are identified in Site 08 ground water. It should be noted that the maximum detected concentrations of arsenic, beryllium, and manganese at Site 08 exceeds the risk-based screening criteria. However, when background data is available it is prudent that a statistical comparison between site concentrations and background concentrations be performed to identify the non-site related chemicals that are found at or near the site (EPA 1989a, pg 5-18, Section 5.7, first paragraph). This exercise is part of data evaluation in a human health risk assessment. The statistical evaluation showed that none of these three chemicals are associated with potential onsite contamination, thus excluded from further analyses as chemicals of potential concern at Site 8 ground water. The analysis in the HHRA and the rational presented herein eliminates the need to perform a quantitative evaluation of exposures and risks to potential human receptors at Site 08.

The HHRA concluded that there were no COCs in Site 08 groundwater at levels of concern from public health protection standpoint. In the absence of COCs in Site 08 ground water, a quantitative evaluation of exposures and risks to potential human receptors at Site 08 was not warranted.

Ecological risks due to the ground water at Site 08 are presented in the *Technical Memorandum - Ecological Risks from Ground Water at NCBC IR Site 08* prepared by EA dated 06 April 1998. To address ecological risk from ground water, the Navy developed a stepwise protocol that first involved screening chemical constituents in ground water against protective criteria such as Ambient Water Quality Criteria (AWQC) or background. If any constituent exceeds screening criteria, the hydrogeology of the site is investigated to determine if ground-water constituents from historical releases at a site could have reached surface water and sediment in the watershed in which the site is located, prior to surface water/sediment sampling in the mid-1990s. If migration of ground-water constituents is judged to be likely, then surface water and sediment concentrations are examined to determine whether they may have resulted from ground water.

At Site 08, implementation of the full stepwise protocol is rendered unnecessary because none of the chemical constituents in ground water being examined for risk exceeded screening criteria in wells on and downgradient of Site 08. Data evaluated for ecological risk include low-flow sampling data from the Phase II Remedial Investigation (RI) (TRC 1994) and background (Stone & Webster 1996). The ground water data indicate that a single constituent, aluminum, exceeded the screening criterion in the Sandhill Brook Watershed background well (MW-WD-2), approximately 1,700 ft to the southwest and upgradient of Site 08. The aluminum concentration

of 13,200 ug/L in this well exceeded the screening criterion (background) of 5,315 ug/L. However, it should be noted that the background screening value for aluminum was based on the 95th UCLM of all Base background wells, therefore a concentration from an individual background well can exceed the background screening level. None of the onsite or downgradient wells at Site 08 contained aluminum in excess of the screening criterion. The source of the aluminum in the background well is unknown, but is assumed to be natural since aluminum is a typical constituent of most soils.

The fact that none of the constituents screened for ecological risk in ground water exceeded screening criteria in Site 08 wells permits a determination of no ecological risk in the Sandhill Brook Watershed from Site 08 ground water. These findings support the No Further Action decision.

G. DESCRIPTION OF THE "NO FURTHER ACTION" ALTERNATIVE

The preferred alternative for Sites 08 and 10 is No Further Action. This alternative was selected based on the results of the risk assessments, along with the results of the Basewide Inorganics Ground Water Study, it has been determined that the areas are protective of human health and the environment. Sites 08 and 10 are within the NCP "target level" acceptable risk range of 10^{-6} to 10^{-4}.

H. DOCUMENTATION OF SIGNIFICANT CHANGES

The Navy presented a Proposed Plan on 14 May 1998 for Site 10 and the ground water at Site 08. The plan proposed No Further Action with respect to soil and ground water at Site 10 and ground water at Site 08. Since the No Further Action decision presented herein is identical to that presented in the Proposed Plan, no significant changes need to be addressed.

I. STATE ROLE

The RIDEM has reviewed the No Further Action Proposed Plan and has indicated its support for the selected remedy. The State has also reviewed the RI/FS, HHRA, and ERA to determine if the selected remedy is in compliance with applicable or relevant and appropriate State environmental laws and regulations. As a party to the FFA, Rhode Island concurs with the selected remedy for Sites 08 and 10. A copy of the declaration of the letter of concurrence is attached as Appendix B.

III. RESPONSIVENESS SUMMARY

The purpose of this Responsiveness Summary is to review public response to the Proposed Plan for no further action with respect to Sites 08 and 10 at the former Naval Construction Battalion Center (NCBC) in Davisville, Rhode Island. Site 08 is the Defense Property Disposal Office (DPDO) Film Processing Disposal Area and Site 10 is the Camp Fogarty Disposal Area at NCBC Davisville. This Responsiveness Summary documents the Navy's consideration of public comments during the decision-making process and provides answers to any major comments raised during the public comment period.

FINAL

September 1998

RECORD OF DECISION
SOILS AND GROUND WATER OPERABLE UNITS

SITE 06 - SOLVENT DISPOSAL AREA
SITE 11 - FIRE FIGHTING TRAINING AREA
SITE 13 - DISPOSAL AREA NORTHWEST OF BUILDINGS W-3, W-4 AND T-1

FORMER NAVAL CONSTRUCTION BATTALION CENTER
DAVISVILLE, RHODE ISLAND

J2089

On 13 August 1998, the Navy held an informational meeting to discuss the results of the RI and to present the Agency's Proposed Plan in accordance with Section 117(a) of CERCLA, and a public meeting to discuss the Proposed Plan and to accept any oral comments. Also during this meeting, the Navy answered questions from the public. From 30 July 1998 to 28 August 1998, the Navy held a 30 day public comment period to accept public comment on the Proposed Plan and on any other documents previously released. Public comments and the Navy's response to comments are presented in the Responsiveness Summary, included in Section III. A public hearing was also held on 13 August 1998. A transcript of this hearing is included in Appendix D.

D. SCOPE AND ROLE OF RESPONSE ACTION

Based upon the risk assessments and the remedial investigations for Sites 06, 11, and 13, which are discussed in further detail in the succeeding sections, no principal threats to human health or the environment have been identified as being associated with the soils or ground water at Sites 06, 11, or 13, providing the basis for the No Further Action decision.

E. SITE CHARACTERISTICS

For NCBC Davisville, an IAS was completed in September 1984, detailing the historical hazardous material usage and waste disposal practices at the facility. Included in the various areas identified in this study were Sites 06, 11, and 13. The IAS was followed by the CS, which included environmental sampling and analysis to verify the presence of constituents at the sites. Specific details of site history and the investigations conducted are provided in the following sections.

The Main Center lies within the Potowomut River Basin. Ground water at the Main Center is classified as GB by RIDEM. Ground water classified as GB may not be suitable for drinking water without treatment, due to known or presumed degradation. GB classified ground water is primarily located at highly urbanized areas or is located in the vicinity of disposal sites for solid waste, hazardous waste, or sewerage sludge.

A comprehensive evaluation of the ground water at NCBC, including Sites 06, 11, and 13 was performed. Previous ground water sampling results were compiled and used to assess the condition of the ground water at these sites. No new field activities were performed for the Ground Water Evaluation. Site history, results of previous studies, ground water monitoring results, and recommendations for future actions are presented in the Ground Water Evaluation. The inorganic analysis results of ground water samples were compared to water quality standards and the background inorganic values as presented in the *Final Basewide Ground Water Inorganics Study Report - NCBC Davisville, Rhode Island*, prepared by Stone & Webster in September 1996.
The *Detailed Analysis of Alternatives Report* (TRC, 1994) contains an overview of the site investigation conducted at Sites 06, 11, and 13. The notable findings of the site investigations are summarized below.

Ecological Risk Summary

The Navy also evaluated potential ecological risks due to soil and ground water associated with the Hall Creek and Mill Creek watersheds by performing an ecological risk assessment and preparing Technical Memoranda for each site to document and evaluate the findings of the ERA. The ERA was performed by identifying organisms (receptors) representative of those potentially present at the site, determining the degree to which they are potentially exposed to site-related chemicals, and quantifying the potential effects of this exposure. The ecological receptors identified for risk assessment were the robin, hawk, heron, shrew, mink, and tern. Ecological risks are quantified by comparing chemical concentrations onsite (represented by modeled chemical dose) with the concentration of each chemical not likely to be associated with harmful effects for a particular receptor (toxicity reference value or TRV). The result of this comparison is a HQ, which is calculated as the ratio of the chemical dose to the TRV:

$$HQ = \frac{\text{Chemical Dose}}{\text{TRV}}$$

HQ values greater than 1.0 reflect a dietary dose that exceeds the safe dose and carries a presumption of risk. HQ values less than 1.0 reflect minimal risk. In general, the greater the HQ the greater the concern for potential risks.

Ecological risks due to surface soil at Sites 06 and 11 are presented in the *Technical Memoranda - Ecological Risk-Based Surface Soil Remediation Evaluation at NCBC IR Sites 06, 10, and 11*, prepared by EA, dated 30 June 1997. The Technical Memoranda for soil were prepared using a stepwise protocol, which included selecting a risk threshold, identifying and validating the appropriate risk drivers, selecting preliminary remediation goals (PRGs), and determining the necessity of further action. As presented in the Final Technical Memoranda, a risk threshold of HQ=10 was chosen based on modeled results for terrestrial receptors whose food base derives ultimately from soil, or the hawk, robin, and shrew.

Ecological risks due to the ground water at Sites 06, 11, and 13, and surface soil at Site 13 are presented in the *Technical Memoranda - Ecological Risks from Ground Water at NCBC IR Sites 06, 11, and 13, Ecological Risk-Based Surface Soil Remediation Evaluation at NCBC IR Site 13* prepared by EA, dated 15 May 1998. To address ecological risk from ground water at all three sites, the Navy developed a stepwise protocol that first involved screening chemical constituents in ground water against protective criteria such as Ambient Water Quality Criteria (AWQC) or background. If any constituent exceeded screening criteria, the hydrogeology of the site was investigated to determine if ground water constituents from historical releases at a site could have reached surface water and sediment in the watershed in which the site is located, prior to surface water/sediment sampling in the mid-1990s. If migration of ground water constituents was determined to be likely, then surface water and sediment concentrations were examined to determine whether they may have resulted from ground water.

The following site-specific information has been taken from the Technical Memoranda.

There is some additional discussion for background at Site 6, but not Site 11.

Site 06

Surface soil

Because there are several sites in the Hall Creek watershed, the surface soil data for Site 06 were examined to determine if the site contained any of the potential risk drivers previously identified in the watershed. Of ten constituents involved in the watershed, nine were not detected at all in surface soil at Site 06. Only cadmium was detected in surface soil at Site 06 at a maximum concentration of 0.75 mg/kg. Cadmium is a potential risk driver somewhere in the Hall Creek watershed because of the cadmium/shrew maximum HQ of 28.3, and associated maximum surface soil concentration of 2.35 mg/kg. However, at Site 06, the maximum surface soil concentration of 0.75 mg/kg would only produce an HQ of 9 for the shrew. Although this is below the designated risk threshold of 10, further examination of cadmium at Site 06 was warranted to ensure that no unacceptable ecological risk existed.

The Site 06 maximum surface soil cadmium concentration of 0.75 mg/kg was compared to various benchmark values, including soil-screening values and background. The maximum cadmium concentration at Site 06 is lower than all of the commonly available soil screening values. It exceeds the NCBC background range, but lies in the lower end of the Rhode Island background range. This information supports a judgment that cadmium in surface soil at Site 06 does not pose an unacceptable ecological risk. Due to lack of a demonstrated risk from cadmium or other COPC in surface soil at Site 06, the soil-based remediation evaluation concluded that there was no ecological risk at Site 06 and that remediation of soil at Site 06 was not warranted.

Ground Water

At Site 06, the potential linkage of chemical constituents between ground water and surface water was assumed, and judgements regarding ecological risk from ground water were based on the number of common COPCs in the two environments, their concentration in both environments, their distribution in ground water, and geochemical considerations. Four constituents exceeded screening criteria in ground water: iron, manganese, lead, and bis(2-ethylhexyl)phthalate. Iron was only detected above screening values in an upgradient well, and manganese was only detected above screening levels in a background well. (Note that most screening values for metals, including manganese, were calculated as the 95 percent Upper Confidence Limit (UCL) of the mean of several wells. Therefore, as in the case of manganese, the concentration in an individual background well can exceed the background screening criterion.) The phthalate compound was implicated as a sampling artifact.

Lead was detected above screening levels in two wells, one up- and one downgradient of Site 06. However, lead did not exceed the screening criterion in samples from wells directly on Site 06, or immediately downgradient to the northeast, the prevailing direction of ground water flow. The concentration of lead in Hall Creek surface water was well below the screening criterion. Lead was moderately elevated over the screening criterion in Hall Creek sediment. The source of the lead in Hall Creek sediment was not established. There are many other possible sources, both on- and off

G. DESCRIPTION OF THE "NO FURTHER ACTION" ALTERNATIVE

The preferred alternative for Sites 06, 11, and 13 is No Further Action. The no further action alternative includes no monitoring, no deed restrictions, and no remedial actions at any of the sites. This alternative was selected based on the results of the risk assessments, along with the results of the Basewide Inorganics Ground Water Study, it has been determined that the areas are protective of human health and the environment. Sites 06, 11, and 13 are within the NCP "target level" acceptable cancer risk range of 1×10^{-6} to 1×10^{-4}.

H. DOCUMENTATION OF SIGNIFICANT CHANGES

The Navy issued a Proposed Plan on 23 July 1998 for Sites 06, 11, and 13 and presented it to the public on 13 August 1998. The plan proposed No Further Action with respect to soil and ground water at these sites. Since the No Further Action decision presented herein is identical to that presented in the Proposed Plan, no significant changes need to be addressed.

I. STATE ROLE

The RIDEM has reviewed the No Further Action Proposed Plan and has indicated its support for the selected remedy. The State has also reviewed the RI/FS, HHRA, and ERA to determine if the selected remedy is in compliance with applicable or relevant and appropriate State environmental laws and regulations. As a party to the FFA, Rhode Island concurs with the selected remedy for Sites 06, 11, and 13. A copy of the declaration of the letter of concurrence is attached as Appendix B.

TABLE 4-1 BACKGROUND INORGANICS CONCENTRATIONS IN GROUND WATER

Parameter	Background Value (µg/L)
Aluminum	5,315
Antimony	6
Arsenic	6.4
Barium	80.5
Beryllium	1.3
Cadmium	3
Calcium	13,302
Chromium	214
Cobalt	24.9
Copper	25.8
Iron	25,500
Lead	4.8
Magnesium	5,126
Manganese	3,292
Mercury	ND (0.2)
Nickel	154
Potassium	3,843
Selenium	2.2
Silver	1
Sodium	12,346
Thallium	4.1
Vanadium	24.4
Zinc	89.9

NOTE:
Data is from Stone & Websters Final Background Inorganics Ground-Water Study Report dated September 1996 and finalized (December 1996) Table 7-4.
µg/L = Micrograms per liter.
ND = Indicates not detected at or above the reporting limit.

Background data also used in risk assessment.

ATTACHMENT C

NAVAL STATION NEWPORT, RHODE ISLAND
DISPUTE RESOLUTION
JANUARY 12, 2012

Agreement
Naval Station Newport, Rhode Island Dispute

January 12, 2012

1. The Navy, as lead agency, has discretion to use more stringent screening criteria developed by the state, in addition to EPA's risk-based screening levels. The State strongly recommends inclusion of all potential chemical-specific ARARs in the screening process if more stringent than EPA's risk-based screening levels.

2. If no unacceptable risk is identified at a site, CERCLA remedial action may not be warranted. If an unacceptable risk is identified at a site, a CERCLA remedial action to address site risks must meet (or waive) ARARs, including chemical-specific ARARs at the site. More stringent state ARARs need to be addressed consistent with CERCLA section 121 (d)(2)(A)(ii), the NCP, the Naval Station Newport Federal Facilities Agreement (FFA), and existing EPA guidance, including OSWER Directive 9234.2-05/FS, *CERCLA Compliance with other Laws Manual; CERCLA Compliance with State Requirements,* December 1989.

3. Consistent with CERCLA and the NCP, remedial actions selected pursuant to section 121 must be protective of human health and the environment. Soil preliminary remediation goals (PRGs) for CERCLA sites at Naval Station Newport shall be developed for the investigation and remediation phases for soils in accordance with established EPA guidance, ARARs, and consideration of background levels. This may result in the development of PRGs for contaminants that were not originally identified as risk drivers.

Senior Executive Committee (SEC) Representatives CONCUR:

Donald Schregardus 1/12/2012
Donald Schregardus, for the Navy

Terrence Gray 1/12/2012
Terrence Gray, for Rhode Island DEM

H. Curtis Spalding, for the EPA